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# WILDLIFE IN NORTH CAROLINA

JANUARY 1994 $1.50

# A Train up Every Creek

*by Jim Dean*

When my old friend A. J. Johnson first took me trout fishing many years ago, he showed me how to catch wild browns in the Pisgah and Nantahala National Forest streams he'd been wading most of his life. But he showed me a lot more. He had accumulated a wealth of obscure history up and down many of those creeks. He knew where unremarkable piles of rocks marked old mills or house sites, whose pasture this had been where 50-year-old trees now towered and how many kids had been raised by whom in a long-gone log cabin beside this spring. He had accumulated this knowledge as part of his deep love of the mountains, the bright creeks and their stream-bred trout.

SHAY LOCOMOTIVE ON NORTH HARPER CREEK. COLLECTION OF ROBERT D. WALKER

It was Johnson who first pointed out to me the fading, but still visible, legacy of the narrow-gauge logging railroads. On almost every creek we fished—miles from dirt roads, often leagues from a paved road—he'd show me the evidence. The trails alongside the creeks were—and still are—graded trams or railbeds with regular impressions of crossties often visible under leaves or moss. The ground in many spots is covered with coal, and it is not unusual to find iron railroad spikes or abandoned tools. Under dense rhododendron thickets, he showed me lengths of cable or other pieces of rusting equipment. I have caught trout in pools that contain twisted rails that mark an era few are old enough to remember. Almost all of it is still there, and Johnson brought it to life for me. Like a new sponge, I sopped it up.

"They put the log purlins here, and the train would come up this gorge below us and cross the creek about there, then go on up that grade" he'd say, pointing out where timber cutters at the turn of the century had constructed a temporary crude log trestle to span a spring run or otherwise unnegotiable gap. I'd look at the steep terrain, the plunging pools, the trees growing up in the middle of the tram and try to imagine a snorting locomotive hauling a steam donkey crane and cars full of virgin logs through this now quiet paradise I had come to love.

Like most of today's casual visitors to our mountains, I was not then aware of what had once taken place in these isolated coves, and certainly not the extent of the intrusion. I knew that western North Carolina had been settled late, and that much of it lay untouched until after 1800 when settlers began to move up the creeks, build cabins and carve out a meager existence. But their impact was marginal, and I could scarcely imagine the changes that had been wrought from the 1880s until the 1940s when huge private timber companies systematically cut the virgin timber from virtually every mountain, cove and creekbank.

If you walk these creeks and hills today, you will find the artifacts of that era along virtually every stream all the way to its headwaters. You will also observe that in the intervening years, young forests have again covered most of these once-barren hills.

Yet, there is a lesson here, one that bears remembering. It is visible in many old photos of logging operations that show the mountains stripped to stumps. When a major hurricane stalled against the Appalachians in July 1916, it dumped 22 inches of rain at Altapass. With scant vegetation left to absorb the rain, huge walls of water moved downstream washing out bridges and entire towns. The French Broad crested at 27.2 feet at Blantyre, and washed away the gauge at Asheville when the water had already risen nearly 15 feet above flood stage. In Caldwell County, Wilson Creek literally washed away the booming logging town of Mortimer, but it was by no means the only community to experience such a fate.

As severe as the damage was to human habitation, the 1916 flood was also disastrous to countless streams that had already been gravely damaged by the intense logging. Some streams would never recover their former native brook trout populations, and it has taken decades to wash out the silt. In 1940, two more floods struck that were nearly as devastating.

We tend to think of such events as natural disasters, but these floods hardly fit that description. Indeed, much of the damage was manmade, the result of uncontrolled timbering that had removed the forests capable of filtering and releasing the water more gradually. Ironically, the floods created the opportunity for the U.S. Forest Service to acquire much of the land that comprises our western national forests, and that set the stage for restoration of the denuded hillsides.

Today, it is easy to judge those who clearcut those virgin forests without thought to consequences, but it may not be fair to do so. Times and priorities were different then, and we are now more likely to manage our natural resources in light of what we have learned the hard way. We still make mistakes, and trout streams are still damaged by roads and timber cutting, but the era of logging trains has passed.

You may thrill to their romantic past, as I do when I walk a trail where logging trains once ran, yet I am thankful that the forest is gradually erasing their memory.

*January, 1994*
*Volume 58, Number 1*

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **Shadows in the Woods** *by David S. Lee* © 1994
*Swift and efficient, these three species of woodland hawks fill their predatory niches in strange and wonderful ways.*

10 **Rails Through the Hills** *by Jim Wrinn* © 1994
*From the late 1880s until the 1940s, narrow-gauge railroads hauled logs down nearly every creek and mountain in western North Carolina, stripping the virgin forests. Today, even as we find romance in those trains, we can scarcely comprehend the vast changes they wrought.*

18 **Ruffly Speaking** *by Vic Venters*
*Ruffed grouse populations tend to fluctuate widely, and their welfare is linked to everything from wild grapes and weather to gypsy moths and timber management.*

24 **Big-Bore Bruisers** *written by Eddie Nickens* © 1994
*photographed by Ken Taylor*
*Do you need one of those new magnum 10-gauge or long-12 shotguns for waterfowl or turkeys? Here's the myth and the reality.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

**Nature's Ways** *by Lawrence S. Earley*

**Back of the Book** *by Vic Venters*

**Wildlife Through the Year** *by Vic Venters*

**Cover** *A subadult goshawk eats a gray squirrel it has caught. Photographed by Len Rue, Jr.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. *Wildlife in North Carolina* has an average monthly press run of 67,498, and an average monthly mail subscription base of 64,626. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

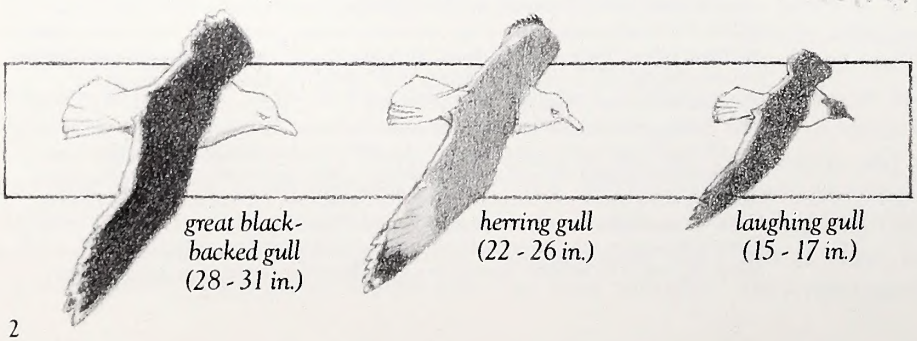
***Great black-backed gulls*** *have wintered in North Carolina for many years, but in the past few decades they have begun breeding here. Thirty or 40 breeding pairs have been sighted on islands in Pamlico Sound. Garbage in landfills, off fishing boats and left on beaches apparently has lured this scavenger south.*

HERRING GULL

IMMATURE BLACK-BACKED GULL

HERRING GULL

GREAT BLACK-BACKED GULL



*great black-backed gull (28 - 31 in.)*

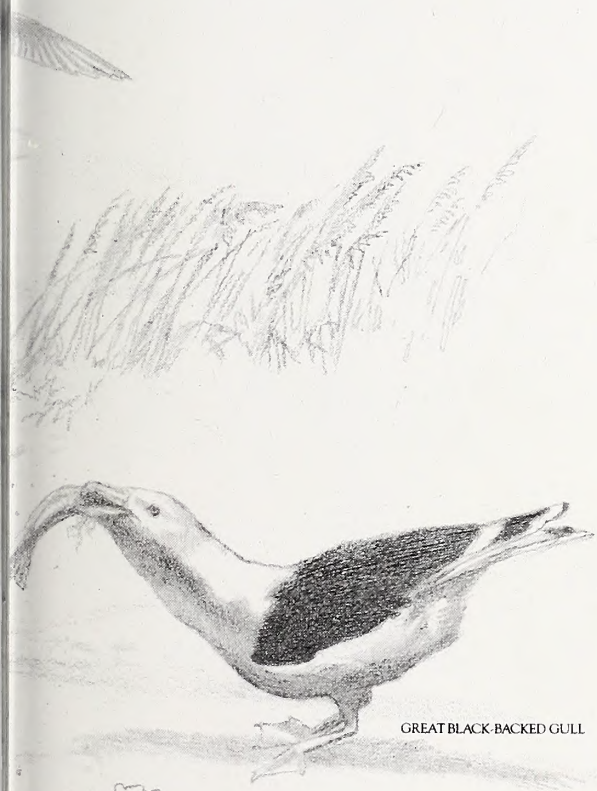
*herring gull (22 - 26 in.)*

*laughing gull (15 - 17 in.)*

***Devotees of the winter beach*** *can easily spot great black-backed gulls. They are the largest gulls in the world, dwarfing some of the other gulls on the beach. Their predatory habits may endanger some vulnerable populations of terns on nesting islands.*

# Big, Bad Gull

*written by Lawrence S. Earley/illustrated by David Williams*



***Though great black-backed gulls** range widely along the East Coast, the North American population center of this bird lies in New England and Nova Scotia. Great black backs are also found in the Great Lakes region, in Greenland and in northwestern Europe.*

Winter visitors to the North Carolina beaches commonly see numbers of a large, white-breasted sea gull with black wings whose coloring has earned it the nickname "minister gull." It's the great black-backed gull, the largest gull in the world. Many of them migrate to North Carolina for the winter.

Up until the 1960s, winter would have been the only time you'd see them here. Then a few nesting pairs were noticed on islands in Pamlico Sound, and their numbers—both winter and summer—have been been gradually swelling ever since. Last summer, scientists observed about 30 or 40 nesting pairs.

While 30 or 40 pairs of great black-backed gulls over several decades hardly represents an invasion, it may well represent an unwelcome change in these birds' range. Range changes are not uncommon among animal populations. Indeed, the ranges of many animals tend to be dynamic, pushing out here and there as food or climate conditions allow. During the last ice age, to cite one extreme example, musk oxen roamed the frigid coastal plain of the state; today they are creatures of the far north.

Though the reasons for the gull's range extension are not clear, scientists suggest that it's mostly due to the presence of more and more human garbage. Especially implicated are fishing boats that discard their "trash" fish overboard; increased numbers of surf fishermen who leave unwanted catch, such as sand sharks, on beaches; and a proliferation of landfills. Our throw-away society has meshed nicely with the great black-backed gull's eating habits, for like all gulls, they are accomplished avian scavengers.

If our waste-producing habits only resulted in a few extra scavengers in coastal environments, perhaps there would be less harm in the black-back's presence. But the ecological repercussions of the great black-backed gull's presence are particularly troublesome because this large gull is a predator as well as a scavenger. Audubon so detested the bullying instincts of the black-backed gull, says Frank Graham in *Gulls: A Social History*, that he named it the "tyrant gull" and even painted it lying on the ground after it had been shot. The black-back joins growing numbers of other scavengers, including the herring gull which has extended its range south and is a ferocious predator itself.

Black-backed gulls will prey on just about anything they can catch, including rabbits, mice, sea birds and terns. They are proficient at robbing eggs and preying on chicks in their raucous nesting colonies, although they will as quickly turn on adults. In the Northeast, they've done considerable harm to eider duck populations. Ornithologist Jim Parnell of the University of North Carolina at Wilmington says that he once photographed a black back that suddenly killed and ate a royal tern sitting next to it. He's also seen black backs catching coots in Lake Mattamuskeet.

Thus, the presence of great black-backed gulls in growing numbers in island bird colonies is something to be concerned about. The bird may well prey on herring gulls, but it may also prey on many of the terns whose populations have already been hard hit by habitat loss. In New England, the U.S. Fish and Wildlife Service has had to control herring gull and great black-backed gull populations to reduce their predation on smaller birds.

The lesson in all of this is a familiar one: the ecological consequences of human actions ripple in all directions and are only rarely predictable.

# SHADOWS IN THE WOODS

Swift and efficient, these three species of woodland hawks fill their predatory niches in strange and wonderful ways.

by David S. Lee ©1994

Each fall, when the weather is right, and if I can find time to get away, I head for the Outer Banks to enjoy the annual passage of southward-bound hawks. I count the birds I see, logging the numbers of each species, the time, dates and weather. Perhaps someday all this will mean something. I don't tell anyone I do this for fun, or that my record keeping is simply the result of too many years of academic biological training.

From mid-September through October, migrating hawks travel down the Outer Banks. The rim of sand makes a nice visual highway for the birds and weather fronts from the northeast make conditions ideal for migration. Sometimes I can see hundreds in a few hours, and on other days there are few, if any. The erratic nature of my viewing is perhaps the real lure. I like to sit and watch from dunes just north of Buxton where Hatteras Island is narrowest and where the hawks are funnelled along a thin corridor. There are peregrines, kestrels and merlins, marsh hawks and ospreys. But by far the most common species is the sharp-shinned hawk. The flight of the sharp-shins—of all accipiters, in fact—is distinctive. They flap their outstretched wings, flap again, and then soar. Even at great distances the alternate flapping and soaring is distinctive enough to separate them from the other kinds of hawks.

On this day I estimated that sharp-shins were coming by about 20 per minute, but as the day progressed, and the cold front moved closer, the numbers decreased and, after about 3:30 p.m., I saw no others. Most of the birds passed high overhead, many taking angled shortcuts over the sound straight to Buxton Woods, probably to settle there for the night. A few flew close to the ground, darting about and skimming over the scattered myrtles and other shrubs trying to flush warblers and other small birds that were also migrating on the same flight plan.

The sharp-shins must really feel out of place on the Outer Banks and are probably quite eager to get this migration business over with. These are, after all, woodland hawks—the Cooper's and goshawk are the other two accipiters found in North Carolina. With short, rounded wings they have sacrificed some of their speed and power for agility. In their woodland haunts they fly full throttle through the forest plucking the small birds

***Fiercely scanning** the terrain for prey, this goshawk flies low across open space. Still counted as a rare permanent resident in the state, the goshawk has been extending its range southward for several decades.*

LEONARD LEE RUE III

LEN RUE JR.

***The sharp-shinned hawk*** *is the smallest of the three accipiters. Though common in autumn when it migrates through the state, it rarely breeds here; however, it is unusual for sharp-shins to remain year-round in North Carolina.*

that make up the bulk of their diets off branches and out of the air. Silent and secretive aerial predators must be rather uncomfortable in the exposed environments of the Outer Banks.

Sharp-shins migrate southward over a broad front like other hawks. Many use the Appalachians and other mountain ridges to catch free rides, or at least inexpensive ones, on updrafts coming from the slopes. Many of those angling southeast with weather systems encounter the Atlantic. The weaker flyers, like sharp-shins, are inhibited by large expanses of open water and often backtrack to find more secure routes. Those that arrive at the coast turn southward to follow the land. Occasionally, I have seen sharp-shins far out at sea, probably individuals that miscalculated winds and the direction to land. Most such birds are probably doomed, but on occasion reports of ones surface that have made it safely to Antillean islands far south of their normal winter range.

My first experience with a sharp-shinned hawk outside the United States was in the Dominican Republic. I was confused. I saw a bird I knew to be an accipiter, but I could not find any additional hawks in my field guide that I did not already know. It was not until I got back home and was able to study more detailed text that I learned that it was simply the Hispaniolian race of our sharp-shinned hawk. Its coloration and face markings were quite unlike anything I had seen before. North American sharp-shinned hawks, making it to the island sometime in the distant past, stayed on to breed and over time evolved into a different-looking race. Their distinctive markings were evidence that few ever make the journey successfully. If there was a constant supply of immigrants from North America, these birds would regularly be contributing to the gene pool and the striking differences would never have developed. The Cooper's hawk, a wide-ranging North American accipiter is also intimidated by open water, but in the past some have made it to Cuba. Although the bird found there is recognized as a distinct species, the Gundlach's hawk, it is clearly derived from the mainland Cooper's hawk.

Accipiter is a Latin word that literally translates as "bird of prey," but biologically this is a genus of woodland hawk that, for the most part, specializes in feeding on birds. Only three species of accipiters occur in North America, but all are known in North Carolina and two of them are quite common—the Cooper's hawk and the sharp-shinned hawk. Each species falls into a different size class because each type of accipiter specializes in different-sized prey allowing them to coexist in the same nesting areas. The stair-step size progression also limits competition for prey stocks during migration and on the wintering grounds. Accordingly the birds range in size from 10 to 26 inches in length.

In Europe a similar situation exists with three different-sized accipiters. There, the largest and the smallest are wide-ranging while the intermediate-sized hawk occupies an area only around the Black Sea. Thus, it appears that the evolutionary processes limiting competition and favoring selection of different-sized prey have proven to be strategies worth pursuing on both continents. In each case the size differences between species are about 30 percent.

Nature has carried size variability one step further. The females of each species are as much as 15 percent larger than their mates. The added advantage is that pairs of these hawks can specialize on different-sized birds providing a larger prey choice in the vicinity of the nest. This provides a more dependable food source for the young, and it allows the parent birds to hunt in smaller and more familiar areas, permitting more pairs to co-

***Accipiters eat** mostly small birds in their woodland habitats. As the largest of all the accipiters, however, the goshawk must supplement its bird diet with small mammals such as squirrels.*

STEVE MASLOWSKI

exist in a given region.

But wait! Aren't the females of the smallest species then competing for the same-sized prey as males of the next largest species? Not really. Although the overall lengths of the females of one hawk species and the males of the next hawk species can be quite close, their weights may be quite different. And carrying that extra weight means that a hawk can go after larger prey.

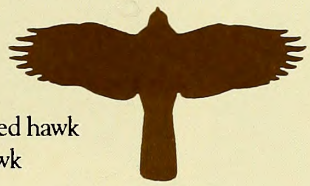
For example, a female goshawk that is only 6 percent larger than the male, weighs an average of 28 percent more. The heavier hawks can overpower much larger prey, while smaller and lighter ones have greater maneuverability and are able to hunt in denser areas of the forest. Yet, as prey size increases, there are fewer kinds of birds available as food items since the smallest birds remain hidden in dense cover and are unavailable to the large hawks. This forces the largest species of accipiter, the goshawk, to supplement its diet with mammals. A male goshawk's diet consists of about 39 percent mammals. The larger females take 66 percent mammals.

All the accipiters are quite secretive—their livelihood is based on surprise appearances. Most people, even ones in tune to the ways of wildlife, seldom see these woodland hawks when they are in residence. You are more likely to come across small piles of feathers, leftovers from their meals, than to see the hawks themselves. Many of the dead birds found under picture windows are the result of the surprise attacks of sharp-shinned hawks. The smaller birds darting for cover often panic and strike windows. As nesting birds, accipiters are also secretive and usually silent around the nest. The best way to locate nests is to be in the woods when the young are nearly ready to fledge. At that time they shed so many down feathers that following a trail of wind-blown down often leads back to a nest.

Occasionally, a Cooper's hawk will relinquish its secretive lifestyle. These hawks can get quite bold and there are many stories of them entering chicken houses and actually going under floor boards to pull out chickens that have run for cover. At times they will even do this while the owner is standing next to the coop. The Cooper's hawk is the true chicken hawk, but now that the days of free-ranging barnyard chickens are drawing to a close, rural folks don't hate this hawk so severely.

While accipiters are secretive, they are not shy. In the last century when egg collecting was in fashion, a number of accounts were

# Know Your Hawks



ACCIPITERS

**Accipiters**
Sharp-shinned hawk
Cooper's hawk
Goshawk

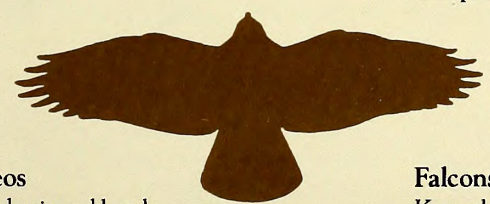
Characteristics:
Long tail; short, round wings.

Flight pattern:
flap-flap-soar.

**Sharp-shinned hawk** (*Accipiter striatus*). Length 10-14 inches; adults have gray backs and rusty barred breast. Distinguished from Cooper's hawk by its square-tipped tail.

**Cooper's hawk** (*Accipiter cooperi*). Length 14-20 inches; adults have blue-gray backs and rusty breast. Distinguished from sharp-shinned hawk by rounded tail.

**Goshawk** (*Accipiter gentilis*). Length 20-26 inches; adults have pale gray, white stripe over the eye. These markings distinguish it from Cooper's and sharp-shinned hawks.

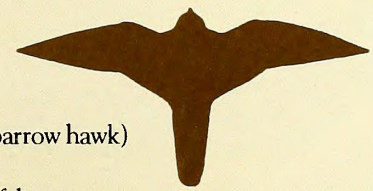


BUTEOS

**Buteos**
Broad-winged hawk
Red-shouldered hawk
Red-tail hawk

Characteristics:
broad, round tail; broad wings.

Flight pattern:
soaring flight.



FALCONS

**Falcons**
Kestrel (sparrow hawk)
Merlin
Peregrine falcon

Chararacteristics:
long tail; long, pointed wings.

Flight pattern:
flapping flight; rapid wing strokes.

written about larger woodland hawks defending their nests. The descriptions of the hawk's attacks equal any stories of big game hunts gone astray on the Serengeti plains. For example, Cooper's hawks were one of the main subjects of study when eggshell thinning caused by DDT was a real concern. Researchers climbing trees to retrieve eggs and to check on the survival rates of the young hawks wore heavy padding and hard hats. Eyes painted on the back of the hats helped to protect them from female hawks trying to strike them in the head. Even so, more than one researcher was knocked out of a tree by protective parents. No wonder university professors began to encourage their students to be field assistants. There are also stories of researchers being attacked by confused hawks while using tape recordings of hawk screams to count accipiters. And more than one woodsman has had a fur hat snatched away by a hungry woodland hawk.

Because of the covert behavior of accipiter hawks, it is really difficult to get a good understanding of their breeding distribution and abundance in the state. Many people think they are rare. Several summers ago we were mist-netting birds in the mountains and were surprised at the number of sharp-shinned hawks we caught. All were in areas where we did not expect them to occur since none were seen or heard for the several days we had been there. We not only caught hawks silently flying through the deep woods, but we also caught some that were coming in for the smaller birds in our nets.

The goshawk is not only the largest of our accipiters, it is also the rarest. It is a species of the north woods and it does not undergo the predictable migrations of the two smaller species. While valid records of these birds from North Carolina and other southeastern states are few, the bird does show up on occasion. At present there are so few records that it is hard to demonstrate any pattern, but it seems that they appear when the populations of snowshoe hares crash in the north and the hawks come south in search of food. At such times desperately hungry birds are forced to move about.

One of the most exciting pieces of bird news that I ever received pertained to accipiters. It came from a lady in Cranberry who sent a letter to the museum describing a very large hawk that she could not identify. She called it a silver eagle. Enclosed in the letter was a sketch that was unquestionably that of a goshawk. She stated that she saw several of these birds repeatedly. Intrigued by her letter I drove to the mountains to see what else I could learn about the birds she described. While it was clear that she was self-taught I found her to be very knowledgeable about the wildlife of the area. To my surprise she told me that the birds nested in her back yard and had successfully raised three young. This was the first indication that this species nested as far south as North Carolina, at the time the closest documented nesting was in the mountains of West Virginia. I later learned that this hawk has been expanding its range southward for several decades. It is not clear if this is a real change in distribution or if the birds are simply reoccupying their historic former range.

Although I was impressed with the lady's eye for detail, her interpretation of her observations was not always correct. For example, she assumed that the smaller birds were the young, not knowing that the sexes come in different sizes. She did not have field guides or other books, and consequently had no clue as to how interesting her find really was. Yet, she was a keen observer, able to describe and illustrate the birds to the extent that there was no question about their identity. Her find was an important record.

It is quite ironic that the ardent bird watchers who rush here and there, armed with expensive binoculars and small libraries of field guides, are obsessed with finding new birds. Yet in a secluded community in the mountains, a significant discovery was made and accurately documented by a lady who was simply thrilled by strange birds and wanted to learn more about what she had seen. For me, the real rewards of nature usually come from quite unexpected quarters.

LEN RUE JR.

***The Cooper's hawk** feeds its young at its nest. Female accipiters are larger than the males and they weigh more. This enables both males and females to prey on animals of different sizes.*

***The original "chicken hawk,"** the Cooper's hawk has occasionally robbed farmers of their poultry. But it more commonly eats rats, mice, grasshoppers and small birds.*

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# RAILS THROUGH THE HILLS

From the late 1880s until the 1940s, narrow-gauge railroads hauled logs down nearly every creek and mountain in western North Carolina, stripping the virgin forests. Today, even as we find romance in those trains, we can scarcely comprehend the vast changes they wrought.

by Jim Wrinn ©1994

For about 60 years, some strange railroads made a stand in North Carolina. Their tracks didn't cover many miles and their trains didn't set any speed records, but logging railroads defied conventional wisdom to deliver the timber.

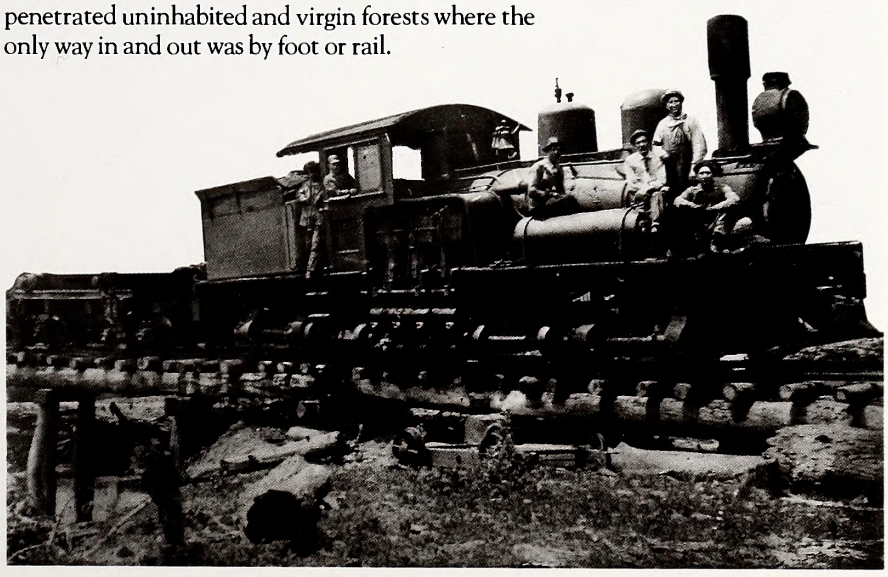
Logging trains were the daredevils of the steam era, defeating the forces of gravity by struggling across incredible grades. The trains rolled over skinny rails and rough-hewn crossties that most mainline railroaders would have laughed at. The locomotives were just plain bizarre—something out of the imagination of Jules Verne. Created out of necessity and with little attention to aesthetics, they were specially built locomotives that earned colorful nicknames like "Sidewinder" and "Black Satchel."

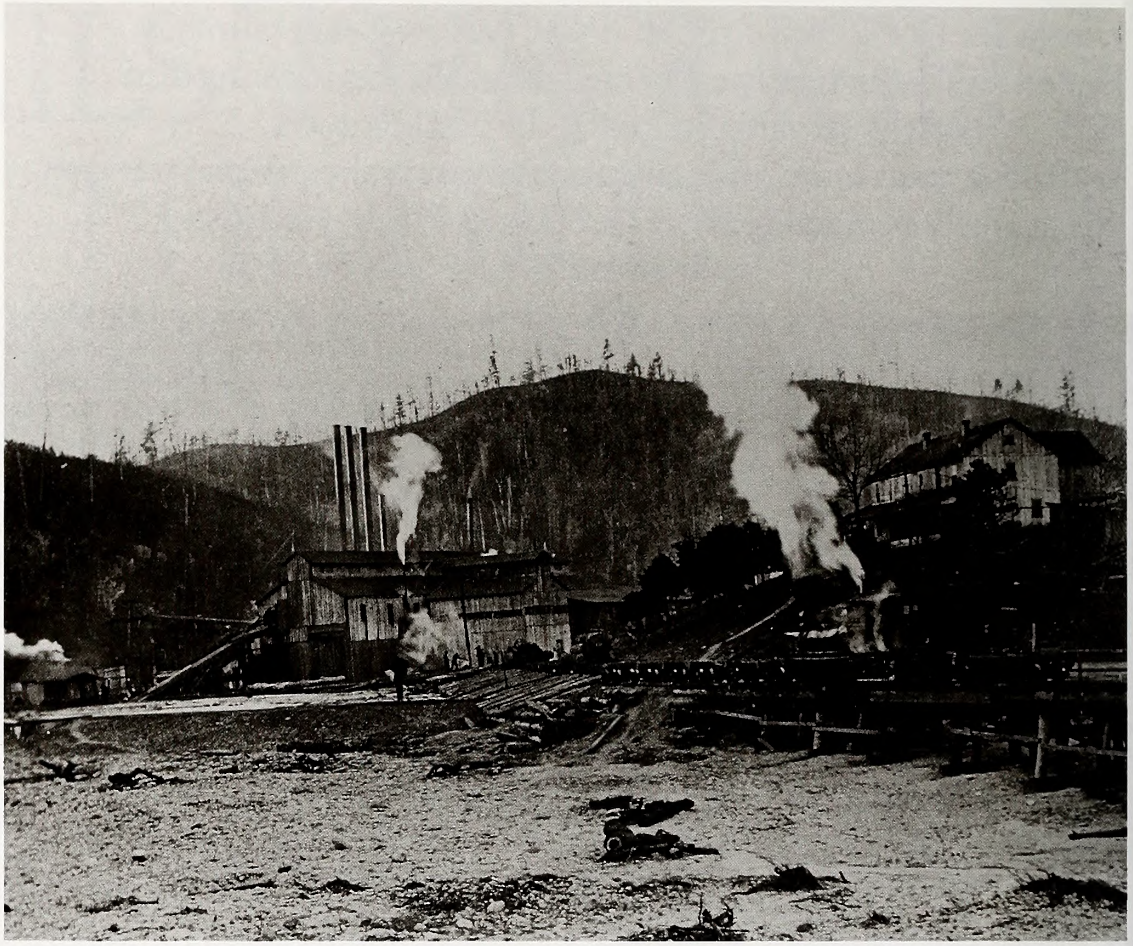
It was largely because of these logging railroads that North Carolina became one of the top four timber producing states in the nation in 1909 and 1914. Dozens of logging railroads operated in North Carolina starting in the 1880s, when the scent of fresh-cut timber was everywhere. The steam logging railroad era peaked just before the Great Depression and never recovered, trailing off to an unremarked end in 1947.

Despite their brief history, these logging railroads put on an incredible show in the North Carolina timber—from the coast near Elizabeth City, where the Dare Lumber Co.'s private rail line ran, to the west, where the Perley & Crockett operation clawed its way to within a few hundred feet of the summit of Mount Mitchell, the highest peak east of the Mississippi.

Yet this spectacular brute force, ingenuity and steam power went mostly unnoticed, particularly in western North Carolina, where most of the lines penetrated uninhabited and virgin forests where the only way in and out was by foot or rail.

**A W. M. Ritter** *Lumber Company log train crosses a precarious trestle thought to be alongside the top of either Upper Creek or Harper Creek falls on its way to the band mill at Mortimer in 1908 (left). Three basic types of logging locomotives were in use in western North Carolina. This one is a Gloucester Lumber Company Shay or "Sidewinder" near Rosman in 1915 (below).*





***A Shay locomotive** unloads logs at the W. M. Ritter band mill at Mortimer shortly before the massive 1916 flood that washed the mill and town away (right). The bare mountains stripped of timber contributed to the severity of the flooding. The hotel on the hill survived, finally falling into rubble in the 1980s. A Hutton, Bourbonnais and Company log train crosses Wilson Creek at Hutboro several miles south of Mortimer about 1919 (below).*

Today, this part of the state's industrial heritage is almost forgotten. Except for rare photographs, a few aging men and two preservation projects, little is left of North Carolina's logging railroad heritage. And despite legitimate concerns we might have today over the wisdom of clearcutting an entire ecosystem, there still remains an aura of romance about these largely forgotten railroads, and a need to remember the vast changes they wrought in our state.

## THE BEGINNINGS

One hundred years ago, the logging railroad era was gearing up, long before the interstate highway system, and long before giant log trucks arrived on the scene. Timbermen were eager for an easy way to get logs out of the woods and to the mills.

For many years, eastern North Carolina's forests of virgin longleaf pine attracted lumbermen. But poor transportation—dirt roads that turned to mud pits in heavy rains—stifled the development of the timber industry.

Before the coming of the railroad, loggers used teams of oxen, mules or horses to drag heavy log carts out of the woods to the sawmills.

In the mountains of western North Carolina, splash-dams were a popular method of moving logs from woods to mill. Lumberjacks would build a dam on a creek and the flooded pond would be filled with logs. Then, the dam would be breached and in the rushing torrent the logs would float down stream. There, they were retrieved and hauled by animals to the mill.

As you might expect, the operation was filled with uncertainty, danger and caused great harm to creeks.

The coming of the railroads changed all that. The first logging railroads started in eastern North Carolina in the early 1880s and quickly moved west, where they reigned for six decades.

As mainline railroads were spiked down across the state following the Civil War, logging railroads began to appear like offshoot branches from a tree. The logging railroads enabled large-scale lumbering to ensue. A locomotive could bring a trainload of logs to the mill at one time, and on a good day could make two to three trips into the woods—a vast improvement over the mules or the splashdams.

## Eastern North Carolina

The exhaustion of the white pine forests north in the Great Lakes Region and the construction of railroads in the coastal mid-Atlantic stimulated the growth of the Southern timber industry. In eastern North Carolina, lines fanned out of many towns.

The activity that took place in the town of Aberdeen is worth noting as a typical scenario. Soon after the main line of the Raleigh & Augusta Air Line Railroad was completed between Raleigh and Hamlet in 1877, the company began to install sidings so timbermen could load pine logs and barrels of turpentine and tar onto flatcars for shipment to distant markets.

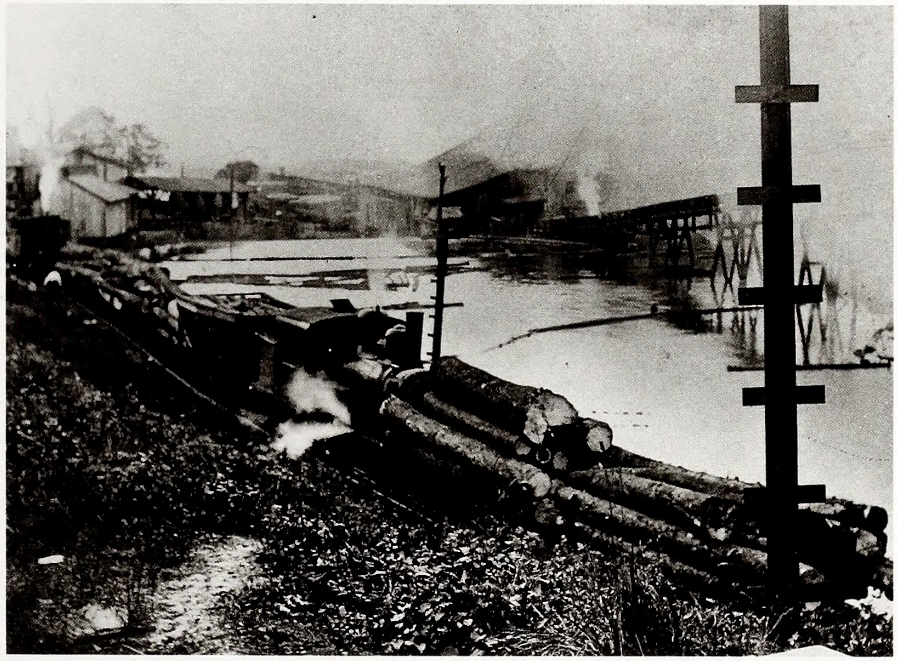
One siding, named "Blue's" in honor of nearby landowner Malcolm Blue, was especially busy. Lumber men from near and far flocked to be a part of the pine harvest that began to grow. The location eventually became known as the town of Aberdeen and boasted no less than three railroads whose main mission was transporting lumber—the Aberdeen & West End, the Moore County and the Aberdeen & Rockfish. In the A&R's first year, six miles of track were built, reaching into a 10,000-acre timber reserve. By 1898, the town of Aberdeen was producing more than 50 million board feet of lumber per year.

The Aberdeen & Rockfish was no stranger to steep grades—one of the hallmarks of all logging railroads. On most main line railroads, a 2 percent grade—or an increase in height of 2 feet for every 100 feet of forward travel—is considered extreme. But the A&R's grade surged to 2.5 percent, and on some logging railroads in western North Carolina, grades as steep as 9 percent were not uncommon. Switchbacks—a track that reverses course or zigzags to gain elevation—were the last resort on most railroads. But they were a frequent solution on logging railroads.

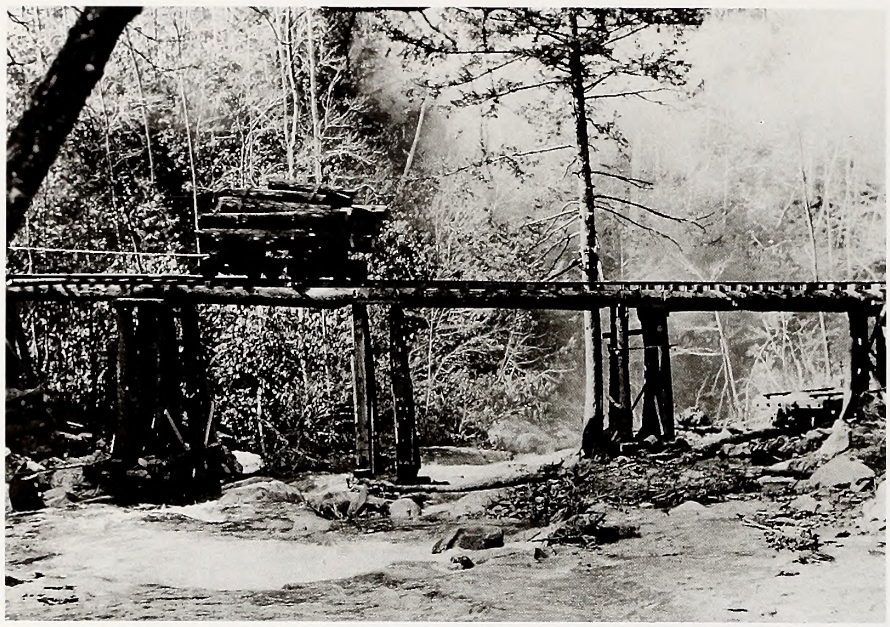
## The Trains

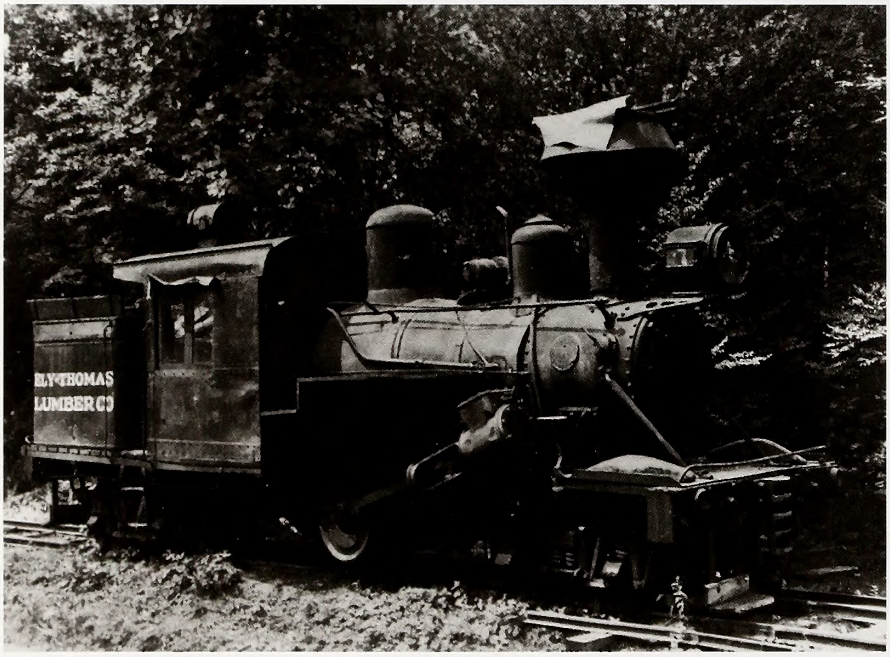
Because of the steep grades that were common on most logging railroads in the Carolinas, timbermen chose their locomotives with care. The engines had to be tough, capable of lugging heavy loads over temporary tracks and able to use water siphoned out of creeks.

Ordinary rod locomotives—which use two sets of pistons to rotate a main rod connected to the wheels by a series of side rods—were used in some logging operations. These were most often found in eastern North Carolina, where the land was flat and



***The empty log cars** and this Climax locomotive operated by Perley-Crockett Lumber Company were photographed at Camp Alice near the peak of Mt. Mitchell in 1918 (top). Two Climax locomotives bring logs to the Perley-Crockett Lumber Company mill between Black Mountain and Swannanoa about 1918 (middle). Virgin logs cut near Snowbird Creek fill a log car (bottom).*






***A car loaded** with logs is roped across a trestle thought to be on either Snowbird Creek, or possibly Fire's Creek, in far western North Carolina (top). Like other narrow-gauge logging locomotives, Climax engines like this one operated by the Ely-Thomas Lumber Company (bottom) generated ample power to negotiate steep grades. A Climax has been restored and is on display at the Cradle of Forestry in America museum on US 276 north of Brevard.*

locomotives with small driving wheels and a short wheel base could maneuver. In fact, logging railroads were so popular by the late 1890s that one Goldsboro company, Dewey Brothers, began building its own engines. Between 1898 and 1928, the company produced 81 small-rod locomotives for loggers in North Carolina and nearby Southern states.

Rod locomotives, however, lacked traction on temporary tracks and steep grades more typical of logging railroads. For that reason, loggers usually favored the use of geared steam locomotives. These were unusual contraptions with cylinders, gears and pipes everywhere, but what they lacked in aesthetics, they made up for in power and versatility.

The first recorded use of a geared locomotive in North Carolina was the construction of a Shay-type engine in 1884 for a logging railroad in Red Springs, south of Fayetteville. Shays, named after a Michigan logger who invented the type, were the most popular logging railroad locomotives across the nation. More than 100 were used in North Carolina at some point in the late 1800s or the first half of this century.

Shays were strange, but powerful, beasts—the mechanical equivalent of Paul Bunyan's blue ox, Babe. They used three cylinders to rotate a crankshaft on the right side of the locomotive; to compensate for the massive weight of the gears and cylinders, the boiler was offset to the left, giving Shays an unusual appearance and earning them the nickname "Sidewinders." Small but powerful, Shays lugged tremendous trains of log cars at their top speed—15 mph. They ranged in size from tiny 36-ton models built to ride on narrow gauge rails—34 or 36 inches in width—to models averaging 70 tons designed to ride standard-gauge rails 4 feet, 8 1/2 inches wide. One of these Shays was among the largest ever built—a giant 125-ton locomotive that was used in the Snowbird Mountains of Graham County.

Also used in North Carolina were the Heisler and Climax locomotives. The Heisler's cylinders were set in a V formation, and transmitted power to a crankshaft running the length of the locomotive directly beneath the boiler. The Climax was similar to the Heisler, but its cylinders were mounted at an angle on the side like a rod locomotive and transmitted power to a crankshaft running the length of the locomotive through a gear reduction box. The smallest of these Climax engines, formally known as Class A engines, were nicknamed "Black Satchels."

While logging locomotives were mechanically sophisticated, the log cars were anything but fancy. Often, they were simple flatcars to which logs would be chained. On some lines, special log cars were built that were nothing more than a frame with four upright posts to hold the load in place. Many logging railroads built their own cabooses, and most had their own camp cars to house the loggers in remote wilderness areas. These were simple homes on wheels, and there were both bunk house cars and kitchen cars.

Logging railroads were relatively simple. Except for the main line of the logging railroad, branches were subject to movement every few years. A line would be laid into a forest. The timber would be cut, and the temporary tracks ripped up only to be spiked down again in the next hollow a few miles away. It was common practice that the locomotives faced backwards in at least one direction on their journey—these railroads had little extra money for fancy extras like turntables.

## Go West

Shortly after the turn of the century, logging moved to western North Carolina. The forests in Pennsylvania and New York states had been depleted, and many of these loggers moved south to tap the vast virgin forests of the Southern Appalachians.

One of these operations tackled a particularly difficult task. Attracted by spruce, balsam and hardwood timber found in the Black Mountains, two Pennsylvanians, Fred Perley and W.H. Crockett, built a logging railroad straight up the side of Mount Mitchell. In 1911, their railroad began carrying timber out of the mountains and by 1914, the line extended more

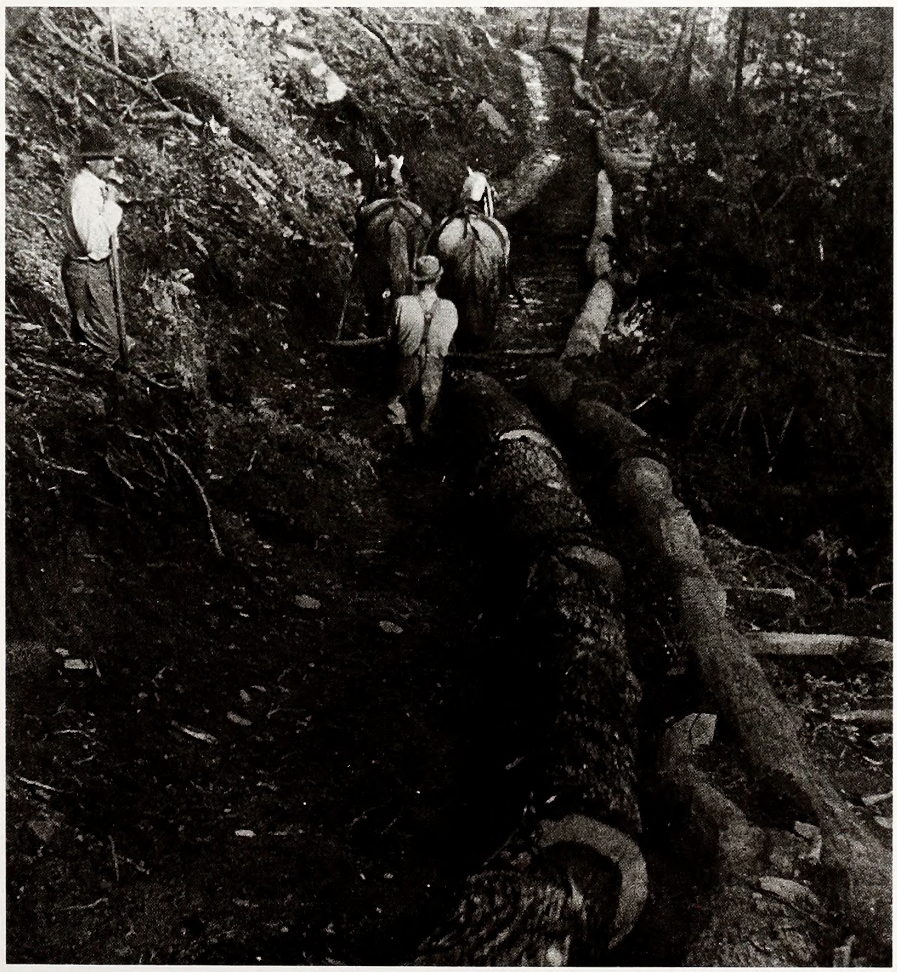
***Huge stumps** from a virgin forest are all that's left on these mountains thought to be near Snowbird Creek in this early photograph. From the 1880s until World War II, virtually every mountain and valley in western North Carolina was stripped of its virgin timber, but younger forests have been restored and now cover much of the region. Mule teams skidded logs to the log trains along trails (bottom).*

than 16 miles from a band mill just east of Black Mountain to the 5,800-foot elevation just below the summit of Mount Mitchell at a location called Camp Alice.

A fleet of Climax and Shay engines was put to work on the mountain railroad, which must have been a sight to see with its 5 1/2-percent grades and nine switchbacks. The line also served as a forerunner to Western North Carolina's modern tourist industry—its tiny trains carried thousands of visitors to Camp Alice on weekend excursions. By 1921, 250 million board feet of lumber had been carried off the mountain. Though many areas were being systematically clearcut, the deforestation of Mount Mitchell prompted an outcry from conservationists, ultimately leading to the creation of Mount Mitchell State Park. Resistance to clearcutting elsewhere was minimal—a sign of the times.

Timbering operations remained in full swing from the turn of the century until the Great Depression. Logging railroads could be found at Mount Sterling, penetrating an area now deep inside the Great Smoky Mountains National Park. W.M. Ritter Lumber Co. lines ran south out of Andrews to Hayesville. At East LaPorte in Jackson County, the Blackwood Lumber Co. favored Climax locomotives, and one line logged the valley now covered by Fontana Lake. Another entered the extreme western part of Macon County in the Standing Indian area. Champion Fibre Co.'s lines logged western North Carolina at several locations, and there were others.

One of the most famous of these logging railroads was the Graham County Railroad Co., a subsidiary of the Bemis Lumber Co. of Robbinsville. The



# HISTORY OF THE RAILS

## MUSEUMS:

N.C. Transportation Museum
P.O. Box 44
Spencer, N.C. 28159
(704) 636-2889
Restoring Graham County Railroad Co. Shay engine No. 1925 to operation.

Cradle of Forestry in America
1002 Pisgah Highway
Brevard, N.C.
(704) 877-3130
Located on US 276 North of Brevard; open spring, summer and fall. Displays former Champion Fibre Co.'s Climax No. 3 engine and cars.

## REFERENCES:

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*Last Train To Elkmont*, by Vic Weals, available from most Great Smoky Mountains National Park gift shops; logging on the Little River on the Tennessee side of the Great Smoky Mountains.

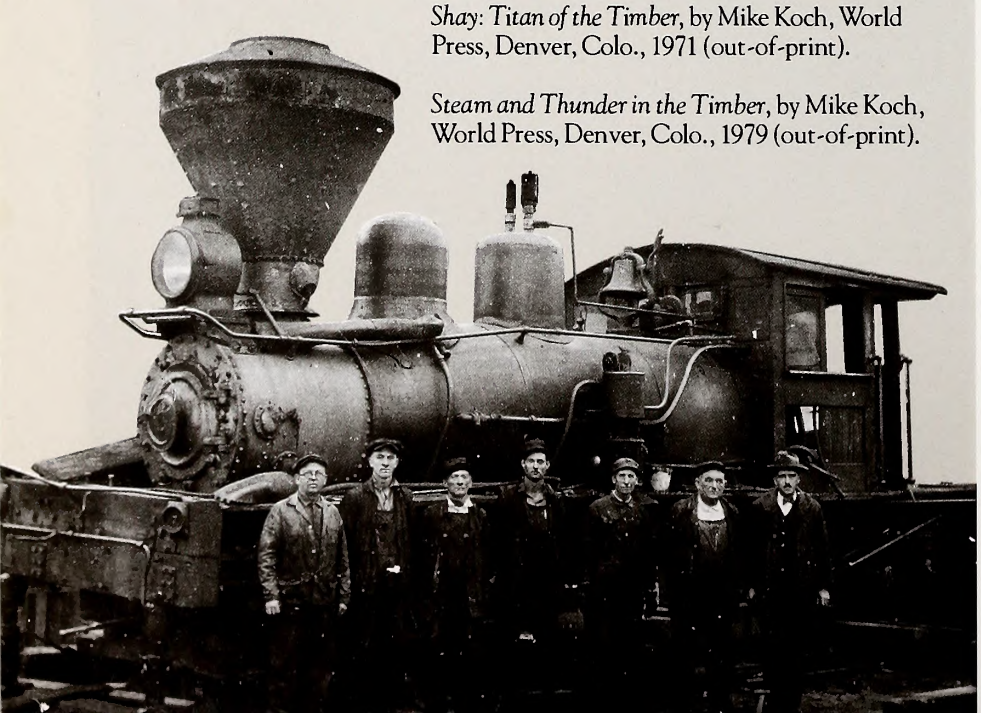
*Aberdeen & Rockfish: The Road of Personal Service*, by Jim Wrinn and Ed Lewis, Aberdeen & Rockfish Railroad Co., P.O. Box 917, Aberdeen, N.C. 28315, 1992.

*A History of Mount Mitchell and the Black Mountains Exploration, Development and Preservation*, by S. Kent Schwarzkopf, N.C. Division of Archives and History.

*The Blue Ridge Stemwinder*, quarterly publication of the East Tennessee and Western North Carolina Railroad Historical Society, John R. Waite, 604 N. Eleventh St., DeSoto, Missouri 63020, (314) 586-4573. $12.50.

*Shay: Titan of the Timber*, by Mike Koch, World Press, Denver, Colo., 1971 (out-of-print).

*Steam and Thunder in the Timber*, by Mike Koch, World Press, Denver, Colo., 1979 (out-of-print).



railroad was built by the Bemis family, which had begun timbering in eastern New York state, following the timber from there to Pennsylvania, then West Virginia and ultimately to North Carolina. Completed in 1925, the Graham County Railroad had a fleet of standard gauge Shay locomotives that did double duty. By day, the locomotives worked the 15 or so miles of logging lines west of Robbinsville on rails known as the Buffalo-Snowbird Railroad, named for the two watersheds the line traversed. At night, the engines toted finished lumber and general freight on their own common carrier line to the Southern Railway interchange at Topton.

The Graham County empire was complex. Deep in the mountains near the Tennessee border on the Buffalo-Snowbird, a web of narrow-gauge lines spread out from a connection to the standard-gauge operation. Here, logs were transferred from tiny narrow-gauge trains onto standard-gauge cars for the final few miles to the mill. Affiliated with Champion Fibre, the narrow gauge penetrated deep into the woods to connect with several incline operations. The inclines used a steam winch to hoist log cars up the sides of steep mountains, where they were loaded and then lowered back down to continue their journey to the mill. The narrow gauge lasted until the early 1940s—near the end of the logging railroad era. The Great Depression claimed many of the railroads, and many that had been abandoned or sat idle were dismantled and sold for scrap metal during World War II.

## END OF AN ERA

The Graham County standard-gauge operations lasted until 1947, when engineer Red Haney pulled the last log train out of the Dicks Creek area behind a 70-ton Shay. After that the railroad continued to haul general freight, while cheaper, more efficient trucks replaced the Shays in the woods.

Thus, the story of steam-powered logging railroads in North Carolina was finished. Better roads, large-capacity trucks and the high cost of building and maintaining a logging railroad doomed these lines.

Today, little is left of these once-extensive railroads, but knowledgeable local historians can point out well-preserved and undisturbed logging railroad grades in the woods at many locations. The grade of the Perley-Crockett operation, for example, is visible from just below the restaurant on top of Mount Mitchell; at the other end of the railroad, just west of the Baptist meeting grounds at Ridgecrest, Narrow Gauge Road helps mark the other end, now obliterated by U.S. Interstate 40. Many of the logging railroad grades north and west of Robbinsville are still visible.

Two of the logging locomotives from the Graham County operation survive. At the U.S. Forest Service's Cradle of Forestry in America near Brevard, the last narrow-gauge Climax locomotive in existence has a permanent place of honor. Originally Champion Fibre Co.'s No. 3, the restored locomotive is on display, complete with a string of log cars and a steam log loader. The locomotive presents a striking scene deep in the forest, and quite often during the summer months, the Rev. Floyd Rose, an old Climax engineer, spins tales of logging locomotives in the woods.

***Steam power is used** to load logs onto Gloucester Lumber Company rail cars near Rosman (left). A 35-ton Climax locomotive heads down the mountain from Camp Alice to Perley-Crockett mill in 1918 with a load of logs that was cut on Mt. Mitchell (bottom). A railroad crew poses beside a Shay locomotive in 1928 (opposite page). Its "sidewinder" drive assembly is on the opposite side of the boiler.*

The N.C. Transportation Museum at Spencer is in the midst of restoring the last Shay steam locomotive left in North Carolina. Graham County Railroad No. 1925 was numbered for the year it was built. It spent its entire career in western North Carolina, doing what it was built to do—haul logs and timber. After logging by railroad ceased in 1947, the engine kept its job at the Bemis Mill hauling out carloads of finished lumber. The locomotive was one of the last of its breed in 1970 when CBS News correspondent Charles Kuralt brought a film crew to record the locomotive's last run. The engine was donated to the museum as a reminder of the logging railroad history that once was.

Volunteers are hard at work refurbishing the old engine. And if all goes well, sometime this year or next, a fire will once again burn in the locomotive's firebox, the Shay will move under its own power and a small slice of North Carolina logging railroad history will come alive again. ☐

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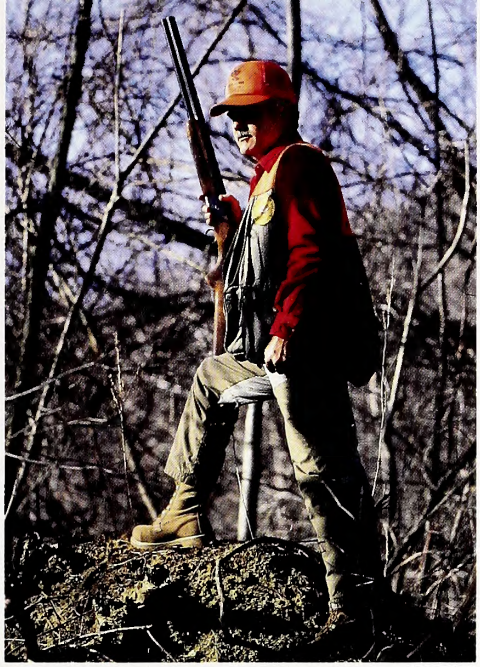
*Jim Wrinn writes for* The Charlotte Observer *and national railroad magazines. He is also a volunteer at the N.C. Transportation Museum in Spencer, where the Shay restoration project is underway. Write N.C. Transportation Museum, Shay Restoration Project, P.O. Box 44, Spencer, N.C. 28159. (704) 636-2889.*

Wildlife in North Carolina *would like to thank Robert D. Walker, Allan Paul, Mallory Hope Ferrell, Elise Monteith Terrell, Rod Sedeker, Burt Anderson and the U.S. Forest Service for their assistance in providing photographs for this article.*

STEVE MASLOWSKI



KEN TAYLOR

# Ruffly Speaking

## Ruffed grouse populations tend to fluctuate widely, and their welfare is linked to everything from wild grapes and weather to gypsy moths and timber management.

by Vic Venters

***Ruffed grouse** are a relatively common gamebird in the mountain counties of western North Carolina, although their wariness makes them challenging birds to pursue, as avid grouse hunters like Steve Henson (above) will attest. The birds are well-equipped to survive snow in even the coldest of winters, provided natural foods and habitat are adequate.*

Read enough about Southern Appalachian grouse hunting and you'll soon discover articles replete with comments about crisp invigorating air, beautiful fall colors, stunning mountain vistas and a host of other descriptive platitudes. Ruffed grouse, however, often seem strangely absent from the dialogue.

Now I know why. On my first real Appalachian grouse hunt, I spent a day romping up mountains and wearing down calf muscles. I couldn't have asked for better guides for my initial outing: Steve Henson, an inveterate grouse chaser and former president of the Ruffed Grouse Society's Southern Appalachian Chapter; and Dan Dessecker, the Society's habitat biologist. We were in prime habitat, trailing a pair of Steve's crackerjack English setters. A single bird we did not see.

Of course, I'm not being entirely fair to my hosts. Throughout western North Carolina, last year was the poorest grouse season on record. The freak May snowstorm and cold, wet weather during the summer breeding season conspired to double whammy grouse populations with a poor hatch of young birds and an almost total failure of mast crop for food. Result? No birds to fly through this dialogue, either.

As tracked by the N.C. Wildlife Resources Commission's Avid Grouse Hunter Survey, flush rates dropped 25 percent in the southern mountain region and 34 percent in the northern mountain region, the lowest flush rates on record since the survey began in the 1984-85 season. No need to get too concerned, though; in good habitat, grouse populations will recover relatively quickly (undoubtedly when I'm not there).

Population fluctuations are to be expected—even normal—with ruffed grouse, particularly in the more northern part of their range. In New England and the Great Lakes states, ruffed grouse follow an almost predictable 10-

LEONARD LEE RUE III

year "boom-then-bust" population cycle that repeats itself seemingly without end. In the Southern Appalachians, the cycle is less pronounced and populations more stable.

In North Carolina, ruffed grouse occur in 23 of 100 counties—all in the western mountain region—but have their largest populations in the southwestern mountains. Judging by Avid Grouse Hunter data, ruffed grouse populations hit a statewide peak in the 1990-91 season, and have since declined for two years. This season, though, populations appear much better than those following last year's disastrous breeding season.

Grouse hunters and the biologists who manage the bird have more than a couple of poor breeding years to be uneasy about these days. Grouse are one of many wildlife species that depend on early successional forest vegetation. To prosper, grouse

***Ruffed grouse populations** thrive in early successional forests. Hen grouse, like other gallinaceous birds, are ground nesters and depend on their natural camouflage, as well as cover provided by young saplings, to escape predators. In spring, Appalachian forests resound with the drumming of male grouse (below) as they stake out territory and attract mates.*

need both the dense breeding and escape cover provided by sapling hardwoods, as well as food provided by wild grape and other soft mast and herbaceous growth found in regenerating young forests.

The potential problem looming—for grouse and other early successional dependent species, anyway—is that much of prime grouse habitat in the Southern Appalachians is growing long in the tooth, particularly on national forests. Because virtually all North Carolina's old-growth mountain forests were logged out by the first three decades of this century, the majority of the second growth forests that regenerated after cutting are now over 50 years of age, well past the stage where they provide good habitat for grouse. In and of themselves, these mature forests are no problem; rather it is the larger trend affecting how these forests are managed that worries grouse biologists and hunters.

Any discussion of ruffed grouse management cannot avoid the controversial topic of clearcutting and the pros and cons of this timber management practice. Without question, excellent grouse habitat is created through a patchwork of scattered small clearcuts in hardwood forests. The clearcuts reach their peak as prime habitat for grouse between six and 20 years. Other game species such as white-tailed deer and wild turkeys and certain nongame species such as chestnut-sided warblers also prosper in young, regenerating forests.

But the practice of clearcutting—indeed, of almost all timber-harvesting operations—is increasingly being opposed on national forests. From the public perspective, clearcutting and timber harvesting in general have become synonymous with old-growth forest destruction, the endangerment of old-growth species such as the spotted owl of the Pacific Northwest, tropical rainforest deforestation and a host of other ecological disasters. Clearcutting is even an issue that divides the sporting fraternity, pitting, on occasion, bear hunters and trout fishermen against grouse or turkey hunters.

In recent years, the U.S. Forest Service has begun reducing the volume of cutting on Forest Service lands and has begun testing alternatives to clearcutting in some areas. The net effect—ongoing even before the clearcutting controversy flared up—has been a decrease in the amount of prime grouse habitat. From 1974 to 1984 in North Carolina, the percentage of forest land acreage classified as hardwood seedlings and saplings declined 39 percent. Similar trends are found in almost all other Southern Appalachian states.

There is no question that large, improperly placed clearcuts can cause all of the ecological evils that have been attributed to them. This is particularly true in virgin, never-cut forests such as those of the Pacific Northwest—where cutting can wreck an ancient ecosystem.

Even in the Southern Appalachians, many species—black bear, as one notable example—benefit from large tracts of roadless mature forested areas. Many other less visible organisms—plants, mammals, songbirds and amphibians—do best in older-aged forests.

"We are not opposed to all clearcutting," says Peter Kirby, the southeast regional director of The Wilderness Society, an environmental group that has been an influential critic of Forest Service management policy. "We do prefer to see the national forests in the Southern Appalachians managed for species like black bear that depend on older successional growth. We are very interested in protecting from cutting the large, roadless tracks of mature forest that you don't find on private lands in the Appalachians."

But forest managers and grouse biologists in the Southern Appalachians argue that they are paying for both the sins of the past and for the sin of oversimplification. The worst abuses of clearcutting are gone on public lands, they say, and cutting operations are now smaller and better managed. They also point to the 520,000 protected acres of the Great Smoky Mountains National Park and the 45 to 50 percent of the Pisgah and Nantahala national forests that are currently removed from any timber harvesting operations.

Foresters and grouse biologists say it is an oversimplification to equate the effects of large clearcuts in virgin Pacific Northwest forests with smaller timbering operations in the mostly second-growth hardwood forests of the Southern Appalachians. There is also a vast difference between the ecosystem fragmentation and permanent deforestation caused by the cutting and conversion of forest land to urban or agricultural and forest regeneration through timber operations.

Public understanding of the effects of clearcutting on the larger ecosystems has been muddied by the political manipulation of the issue by factions at both ends of the environmental spectrum. "I sat in a conference on old growth this year and listened to a representative from one environmental group use the plight of neotropical birds that need older forests to advocate the establishment of large wilderness areas in national forests," explains Allen Boynton, the N.C. Wildlife Resources Commission's nongame biologist for the western mountain region. "On the other hand, I've heard people make the case that many brush-dependent neotropical species have been declining since the 1960s, so they say we need to clearcut the national forests. People tend to pick and choose from the scientific literature that appeals to their own respective cause."

It is safe to say that no responsible biologist advocates cutting all Appalachian forest areas. "The forests of the Southern Appalachians have a tremendous diversity of endemic organisms, many of which are threatened, endangered or sensitive to disturbance," explains Rod McClanahan, a former Wildlife Commission biologist and the current forest wildlife biologist for the national forests in North Carolina. "So there are legitimate concerns about the effects of clearcuts in many sensitive areas. Having said that, there is also a role for creating wildlife openings for wildlife habitat needs, both for game and nongame species."

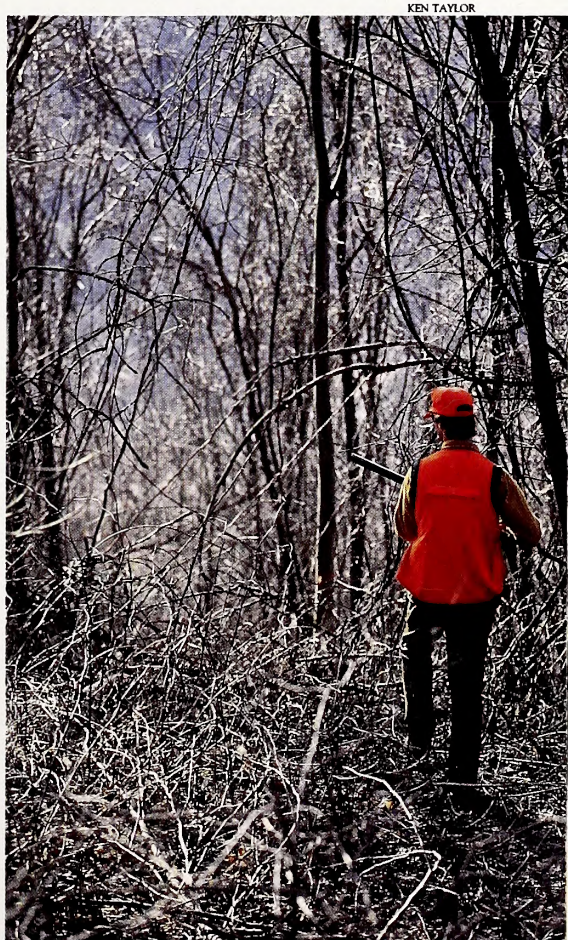
"There are many reasons for retaining a significant percentage of forest acreage in undisturbed or wilderness conditions," writes Dr. Sam Purseglove, executive director of the Ruffed Grouse Society. "But then, too, there is a place for modern forest management methods including clearcutting. The trick is to hit the right balance."

Finding and defining "balance" in the Southern Appalachians will be no easy task in this emotionally charged atmosphere of charges and countercharges. What is badly needed, biologists say, are more scientific studies that examine on a landscape scale when and where forestry practices may and may not be appropriate.

In recent years, the Forest Service has

***This hunter** advances on a hidden English setter pointing in a snarl of vines and thick brush that ruffed grouse prefer.*

KEN TAYLOR



LEN RUE JR.

## Grouse Society's Appalachian Chapter

Founded in 1961, the Ruffed Grouse Society is a national private, non-profit conservation group dedicated to improving habitat and educating landowners about management issues that help forest species such as ruffed grouse and the American woodcock. The Society publishes an excellent magazine and habitat management booklet for private forest landowners.

In North Carolina and neighboring states, the Society's Southern Appalachian chapter has over 750 members and is active throughout southeastern national forests. So far, the chapter has helped fund ruffed grouse habitat at these management area projects: 2,000 acres at Georges Creek, Cherokee National Forest near Erwin, Tenn.; 2,545 acres at Wallace Branch on the Nantahala National Forest near Franklin; 6,000 acres at Hurricane Ridge near Cove Creek on the Pisgah National Forests; and 100 acres at Hooper's Bald in the Nantahala National Forest near Robbinsville. It is currently working on a habitat project at Ledbetter Creek in the Nantahala National Forest.

For more information, contact the Ruffed Grouse Society, 451 McCormick Road, Coraopolis, Penn., 15108. For information on the Society's Southern Appalachian Chapter, contact Steve Henson, Rt. 2, Box 140, Clyde, N.C. 28721, or call (704) 627-0516.

begun testing alternative timber harvesting methods such as single tree selection, group selections (which are mini-clearcuts one to two acres in size), and shelterwood cutting, where 60 to 80 percent of the mature trees are removed leaving the remainder to produce seedlings and wildlife food until they, too, are harvested years later.

Of these alternatives, shelterwood cuts appear to offer the best habitat for grouse, particularly on moist sites where good sapling growth is assured. "Shelterwood treatments can produce quality habitat for ruffed grouse in some situations but they should not be viewed as the optimum regeneration method where grouse habitat is a primary concern," says Dan Dessecker, the Grouse Society's biologist. "Clearcut regeneration harvests should be considered optimum in this instance."

At the moment, though, it's hard to tell what type of cutting and how much—if any—will be allowed on national forest lands in the future. There are bills in Congress to ban all cutting on national forests, as well as administrative mandates proposed to eliminate all below-cost timber sales. Therefore, the outcome remains unknown at this time.

It has been argued by some environmental groups and biologists that private timberlands should provide habitat for early successional wildlife species, while national forests should be preserved for older mature wildlife species. Indeed, with the supply of cheap timber from federal lands increasingly restricted, the laws of supply and demand may eventually drive hardwood lumber prices up, precipitating more timber harvest on private lands.

This could benefit grouse in some locales, but many of the trends taking place on private lands are not at all positive for ruffed grouse. The Appalachians are becoming increasingly urbanized and suburbanized, hardly conducive to any wildlife species. Likewise, the impact of Christmas tree plantations and the resulting chemical use worry some biologists, although the effects are unknown at this time.

Of course, land management isn't the only factor that can affect grouse populations. Last year, for instance, some grouse hunters in Northwestern North Carolina expressed concern that resurgent wild turkey populations might be harming grouse, because, they argued, adult turkeys were eating young grouse hatchlings.

"While an adult turkey might occasionally eat a hatchling, they are not serious predators of ruffed grouse," explained Terry Sharpe, the Wildlife Commission's small-game project leader. "This is not going to be a factor depressing grouse populations."

Lately, grouse biologists around the Southeast have been re-examining hunting pressure and its potential effects on grouse populations. In the past, studies throughout the country indicated that hunting pressure had little or no effect on ruffed grouse populations. In recent years, however, research in the Great Lakes states shows that heavy hunting pressure—particularly on heavily used public areas—can depress populations in those areas.

In general, biologists believe hunting's impact on grouse populations depends on the amount of pressure, the size and quality of habitat hunted, and the time of year when the birds are hunted. For instance, grouse populations isolated in "islands" of habitat are probably more susceptible than those where grouse habitat is large and populations are widely dispersed, particularly late in the hunting season.

There is no evidence to indicate that hunting pressure is depressing ruffed grouse populations in North Carolina. In 1991, there were an estimated 10,000 grouse hunters in North Carolina, a drop of about one-third since the 1986-87 season. Given the four million potential acres of grouse habitat, hunting pressure appears to be light to moderate in most areas. Measured by avid-hunter harvest rates, populations were increasing in areas of good habitat until two years ago. Nonetheless, hunting mortality is an issue biologists will keep an eye on, particularly if good grouse habitat begins to shrink.

Of course, the wild card in the whole ruffed grouse management picture is the much-feared gypsy moth. Released accidently by a French scientist near Boston in 1869, this exotic moth species has since spread to 20 states, with 76 percent of hardwood forests in the eastern United States considered at risk. The U.S. Forest Service spends millions of dollars each year to control the exotic pest, which defoliates forests—particularly the various oak species—by eating the leaves and tender green growth shoots. Tree mortality varies from site to site, but can be high where defoliation is severe and repeated for several years.

In 1981 alone, gypsy moths defoliated 2.1 million acres in Massachusetts and 14 million

acres throughout the Northeast. Currently it is spreading south down the Appalachians through the Shenandoah Valley in northern Virginia. There have already been isolated outbreaks on the North Carolina coast and in the mountains. While control efforts have slowed the gypsy moth's spread to the South, they have not been able halt it. When the gypsy moth will arrive in force is anyone's guess.

In heavily infested southcentral Pennsylvania, the gypsy moth has proved a boon for grouse populations, at least in the short run. "It's been grouse heaven in the south-central region of Pennsylvania," said Bill Palmer, a field biologist and grouse expert for the Pennsylvania Game Commission. "In that region, we had extensive areas of hardwoods defoliated, killed and subsequently cut for salvage timber. I'm afraid later on, however, that it may not be so good for grouse since so much acreage will be maturing at the same time. That means there won't be much timbering in the future for quite some time."

In some of the infested areas of Virginia, likewise, state wildlife biologists have reported that in "some areas where gypsy moth defoliation and related tree mortality have opened the canopy, the understory is responding with increased soft mast and higher stem densities which are short-term benefits for grouse."

Which is not to say that the eventual arrival of this highly destructive pest to North Carolina's mountains should be cheered, but it seems likely that grouse populations may benefit, at least in some localized areas. In addition, other natural disasters can also create grouse habitat through hurricanes, fires and tornadoes. In 1989, for instance, Hurricane Hugo downed 30,000 acres of timber in Wilkes County alone, creating many pockets of good habitat.

Coming out of a trout stream in the Wilson Creek watershed about a decade ago, I encountered a fly fisherman—a local, oddly enough. It was late September and fall was in the air. As we hiked the path up a mountain to our cars, talk soon turned to bird hunting—quail and woodcock for me, grouse for him.

"I had a good season last year," he told me. "Went about 20 times."

"Yeah? How'd you do?"

"Got four," he beamed, "for the season."

I winced. "Oh."

Good season? Four birds in 20 hunts? Obviously not a lot of birds flying through his dialogue, either. Grouse hunters, I've since learned, measure success in birds they've "flown" or flushed, not the shots they've taken or number of birds they've bagged. There's something magic about that attitude and, given the demanding terrain the bird is hunted in, it's clear the ruffed grouse brews a strong potion for those who love to hunt it.

Aside from gorgeous scenery, much of it has to do with the sheer challenge of the hunt, of pitting your dog's nose and intelligence against the bird's cunning and guile, and its legendary ability to use airborne agility to weave an escape route through dense brush, all the while sounding like a burp gun with wings as it roars away. If what I learned is any indication, the ruffed grouse has fully earned its sobriquet "king of the upland gamebirds."

In coming years, King Ruff will no doubt need all of its guile and cunning to prosper in what may be an uncertain environment. ⊠

***Pointing dogs,*** *like this handsome English setter, are the preferred breed for grouse hunting, although some hunters follow flushing dogs like springer spaniels. Because of the innate wariness of ruffed grouse, dogs must possess intelligence, as well as have a keen nose, to hunt the bird successfully.*

KEN TAYLOR

# Big-Bore Bruisers

## Do you need one of those new magnum 10-gauge or long-12 shotguns for waterfowl or turkeys? Here's the myth and the reality.

written by Eddie Nickens ©1994
photographed by Ken Taylor

At a gun show a couple of years ago I was drooling over a side-by-side of European heritage when a customer with a Mossberg 835 slung over one shoulder asked the dealer if he'd like to buy his gun. Even without knowing the model number, I could tell there was something different about this Mossberg. I'd shot a 12-gauge pump for years, and though my model of choice is an Ithaca Featherweight, there was more metal in that Mossberg receiver than any other pumpgun I could recall. This was no ordinary 12 gauge.

When I asked about the gun, I learned it was chambered for the relatively new 12-gauge, 3 1/2-inch shell. It's a great gun, the fellow told me. Rugged. Dependable. Plenty of power.

"So why are you selling it?" I asked.

The fellow winced. "Because it hurts too much to shoot it."

Brutal. Vicious. Bone-crushing. Those were the first reports of the new long-12 shell that packs in its lengthened hull a shot charge that approaches that of the 10-gauge. Despite those tales of jarring recoil, many gunners were willing to take the medicine. The reasoning was it would be an advantage for turkeys, and especially for waterfowl, to overcome any shortcomings in steel shot that are now required.

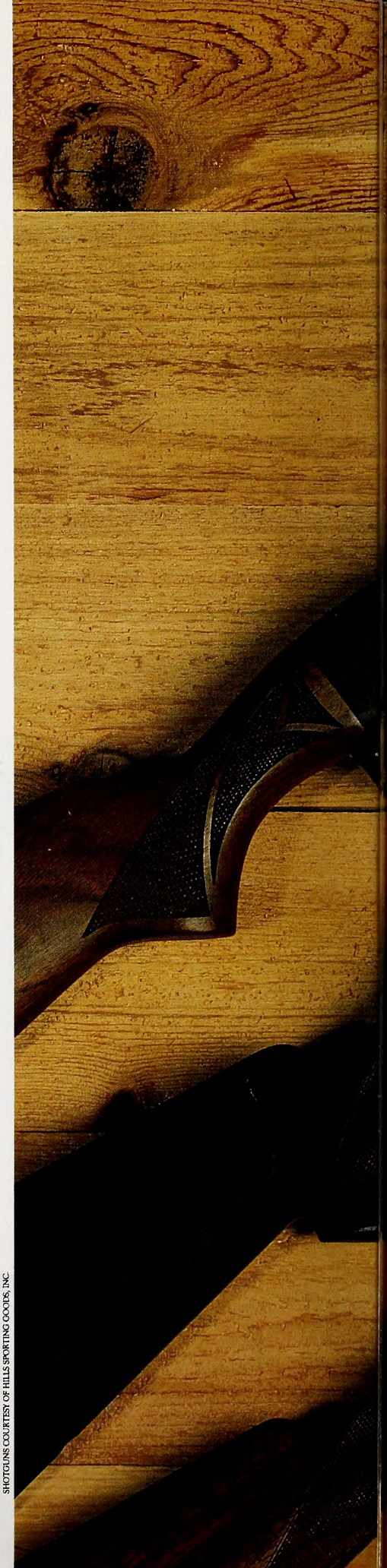
My gun show acquaintance had been pushing magnum lead turkey loads through his tubes, and the physics of jump-starting heavy lead shot from a sitting position had played havoc with his shoulder. Even so, big-bore 10- and 12-gauge magnums are becoming the choice for more and more waterfowlers willing to take their medicine for increased power.

When they were first reintroduced I'd looked askance at big-bore chamberings for waterfowl because I knew that too many hunters might use the increased power to justify shooting at birds even farther out of range than before. I still contend this is all too often the case—the reason you can't consistently kill a duck at 60 yards is because such a shot is simply too far for the average hunter to connect with consistent killing power. Furthermore, you can sure maim a bird at that range and never even know it. Putting a 10-gauge gun into many duck hunters' hands might actually result in more crippled birds.

Still, there's little question that the higher payload in these new guns offers definite advantages for those mindful of their limitations. I've since shot a few of these big-bore battering rams and have spent some library time researching what the experts say the others can do. After comparing shotshell ballistics I'll concede that these guns and loads are great for waterfowlers who want clean kills at considered ranges, but not for skybusters hoping to extend their shooting zone by another 20 yards. No ballistics can cover up poor shooting or out-of-range shots.

### The Ammo

Albert Einstein put it in words few of us can understand: $E=MC^2$. His theory that energy equals mass times velocity squared has



SHOTGUNS COURTESY OF HILLS SPORTING GOODS, INC.

***A comparison of** the shells (lower right) dramatically reveals the differences between a standard 2 3/4-inch 12-gauge, the 3 1/2-inch long 12, and the huge 10-gauge shells. Examples of the guns that handle these loads are, top to bottom, the 10-gauge Remington SP-10, Browning BPS Super 12-gauge and 12-gauge Browning Citori.*

***Some hunters like** big-bore shotguns for waterfowl. The season, however, is closed on Canada geese (top) in North Carolina. A big-bore shotgun doesn't enhance killing power at greater ranges; thus sky-busting or taking long shots would still cripple birds (bottom).*

affected our lives in innumerable ways, but none so important this time of year as in our choice of waterfowling weaponry. Consider that 10-gauge shotshell, the new darling of the magnum shotgun set. This is no newcomer to the American firearms market, having been a staple of waterfowlers back when barrels were made of Damascus steel. But with the advent of steel-shot requirements, the 10-gauge has found itself back in favor. A 10-gauge, 3 1/2-inch shell can handle 27 percent more steel shot than the 12-gauge, 3-inch round, and that carrying capacity translates into more knockdown power where it counts—at 40 yards over the decoys.

But the 10-gauge is heavy and it has a reputation for recoil all out of proportion to the net gain in power. Having known the 12-gauge for all of their hunting lives, few hunters initially wanted to venture into unknown 10-gauge territory. Enter, then, the so-called "super-12" or "long-12," an extended version of the familiar 12-gauge that is a duckblind staple. Gun buyers, conventional wisdom suggested, might line up at the cash register for a bigger, better version of the standby 12-gauge where they feared to tread behind the muzzle of the legendary 10. And so was born an entirely new shotgun shell, an artillery-like, 3 1/2-inch load both lauded and lambasted by early pundits.

The super-12 came about as ammo manufacturers were experimenting with ways to boost now-required steel shot's performance to lead pellet levels. Lighter than lead pellets, steel shot doesn't retain as much energy as the denser lead material. In order to boost effectiveness, more pellets were required. At 30 yards, a No. 4 lead pellet pushed at 1330 feet per second at the muzzle will retain 5.6 foot-pounds of energy. A steel pellet of similar size and muzzle velocity will weigh in at only 3.5 foot-pounds of energy at 30 yards.

Up the pellet size to steel No. 2, and energy is boosted to a level in the lead-pellet range. The problem is, the number of pellets that can fit into a shotgun shell decreases as the size of the shot increases.

The answer has been to stretch the shell, and the long-12s are the result. Packed into the extended shot column of the new 12-gauge, 3 1/2-inch load are 1 9/16-ounces of shot, which translates into 195 No. 2 pellets, an increase of 39 pellets over even the 3-inch magnum, 1 1/4-ounce load.

But the price of an increased payload, according to some experts, means a decrease in the efficiency of the shell. Jim Carmichael, writing in *Outdoor Life* a couple of years back, declared that "the long-12 should be arrested for violating the law of diminishing returns." Carmichael's reasoning was that, even if pellet numbers were impressive, pellet performance fell short because of the lengthened "shot-string" thrown by the long-12 shell. With all those shot piled on top of each other, the pellet payload actually "strings out" in a pattern up to 15 feet long—not wide—at long ranges. Big deal if there's a higher payload, some pundits said; if the shot don't arrive at the same time, their effectiveness is diminished. Others cite computer modeling that suggests that all pellets arrive on-target within milliseconds, so debates regarding shotstring inefficiencies may not be accurate.

What is not in doubt, however, is that these guns are hot market items. If you've decided to try a big-bore bruiser, you now have even more decisions to make. Pumpgun or autoloader? Long-12 or 10-gauge? Would you rather carry a heavier gun and feel less recoil, or save the sweat and tough out the occasional kick? And higher pellet payloads aren't the only big numbers associated with big-bore magnums. Price tags that soar upwards of $1,000 will wreak as much havoc with checkbook ballistics as with a flight of high mallards. There are, however, models guaranteed to blot out the sun with steel, but still go easy on the wallet.

**The Arms**

Once I downed a high-flying swan with a single pull on the trigger of the now-discontinued Ithaca Mag-10, known today as the Remington SP-10. I recall the punch of that shot being much lighter than I expected, but that's partly due to a gun that weighed in at a dreadful 11 pounds. And believe me, memories of carrying that gun around those frozen soybean fields are as much a part of that hunt as the sight of a swan folding up in the blue sky.

Sir Isaac Newton said: "For every action there is an equal and opposite reaction." This is the maxim big-bore shotgun manufacturers have been struggling with ever since steel shot replaced lead. Early on, adding weight to the weapon was one sure way of side-stepping Newton's laws. Today, gun manufacturers offer more sophisticated means. To ease the pain, off-the-rack hunting arms today are sporting recoil-reducing amenities previously found only on custom guns.

The most popular method to date to take the brute out of a big-bore kick is to backbore the barrel. By increasing the bore diameter of a shotgun barrel, friction of the shot charge against the barrel wall is reduced, cutting recoil while boosting shot velocity and pattern efficiency. Not so long ago only high-dollar sporting clays guns came backbored from the factory. Now many factory hunting arms sport backbored barrels as a standard feature.

Another way to reduce recoil is to put some of that trigger-initiated power to work before it reaches the shooter's shoulder. The gas-operated semiautomatic action spreads the gun's kick over a longer—if by milliseconds—time period, siphoning part of the shell's rearward oomph to work the action. The result is a shove rather than a kick, and a little less of it. Fixed-breech guns such as over-and-unders and pump-action shotguns deliver all that power in one sharp kick to the shoulder, and it's a noticeable difference.

*"Larger shells help offset some of the disadvantages of lighter steel, but only within normal ranges under 40 yards."*

If you've decided to invest in a big-bore shotgun, here is the lineup you'll have from which to choose:

• **Mossberg** rocked the gun world in 1988 with the introduction of the Model 835 Ulti-Mag 12-gauge, 3 1/2-inch pumpgun, a configuration duplicated by a manufacturer called Maverick, which in a few years disappeared from the high plains of arms makers. Mossberg's Ulti-Mag still defines the working class of long-12 chamberings with two camo finishes in addition to American walnut wood. The Ulti-Mag digests all 12-gauge loads, from light trap loads to the heavy steel and lead long-12s. To tame recoil, the Ulti-Mag comes with a fully back-bored barrel and recoil pad, though by all accounts it still packs a punch.

• **Remington** for several years enjoyed a monopoly on manufacturing the 10-gauge gas auto with its SP-10 Magnum that was based on the Ithaca's design of the world's first autoloading 10-gauge shotgun. Pushing 11 pounds, this is no upland gun-turned-goose-getter, but it's proven itself in the field for several years. Remington offers a wider range of barrel configurations for its autoloader than anyone else, with 23-, 26- and 30-inch smoothbore tubes available, plus a 22-inch rifle-sighted turkey barrel.

• **Browning** added a 10-gauge BPS pump shotgun to its offerings in 1988, and today the Utah gunmaker offers pump-action scatterguns in both the 10-gauge and the 12-gauge, 3 1/2-inch magnum. Browning also builds a 12-gauge, 3 1/2-inch Citori Lightning over-and-under. Barrels on all these models are back-bored. Browning's big news in the big bore category, however, is the introduction of the Browning Gold Semi-Auto 10-gauge, the first 10-gauge autoloader to lock horns with Remington's SP-10. With a 28-inch barrel, Browning's brute weighs a hefty 10 pounds, 10 ounces, but that weight combined with a gas-operating action should make recoil feel no heavier than a 12-gauge, 3-inch magnum. Originally scheduled for a spring 1993 release, the Browning Gold should be finding its way into gun stores by now.

• **Heckler & Koch/Benelli** has been the talk of the big-bore circuit ever since it released the Super Black Eagle, the only 12-gauge, autoloading shotgun that shoots all 2 3/4-inch, 3-inch and 3 1/2-inch hunting weight shells. Its specifications read that it handles all "2 3/4-inch, 1 1/8-ounce field loads and most light target shells," but there have been reports that the Super Black Eagle does have problems digesting the lightest 2 3/4-inch target loads. That shouldn't concern the primary market for the gun: hunters who want to use one gun for all game. For that, the Super Black Eagle is well suited, especially considering that you get five screw-in chokes instead of the standard three. Some might say you should expect it, since the gun's weight on the checkbook hovers in the $1,000 range.

There are choices even for those who like over-and-unders or side-by-sides, but the chamberings for these bad boys will surely test the mettle of any shooter. American Arms manufactures in its Specialty Series over-and-unders and side-by-sides in both the 10-gauge and 12-gauge, 3 1/2-inch chamberings—which at (relatively) wispy weights might be joys to point, but painful when the trigger is pulled. Beretta's 686 Onyx also comes in the long-12 configuration.

I still sport a 12-gauge, 2 3/4-inch gun most of the time I'm in a duck blind, because I've made the choice of drawing the line on long shots and being happy carrying a familiar gun that's downed every duck I've ever plucked. But this I know. Newton may have been on my side, but had Einstein been a duck hunter, I suspect he'd have been a 10-gauge man. ☐

*Coastal Futures Committee Created*

## Governor Hunt Proclaims 1994 Year of the Coast

*Written and Edited by Vic Venters*

The new year celebrates the 20th anniversary of North Carolina's Coastal Area Management Act (CAMA), one of the nation's pioneering efforts to establish a planning and regulatory program for managing the coastal environment.

Gov. James B. Hunt has also designated 1994 as "The Year of the Coast," and by executive order created the N.C. Coastal Futures Committee (CFC), a new 15-member panel that will evaluate current management programs and recommend changes where needed. As part of the initiative, a "Year of the Coast" subcommittee has also been formed that will promote the work and existence of the Coastal Futures Committee.

During the 1980s, the population at North Carolina's coastal zone grew at almost twice the rate of the entire state, putting increasing pressure on the region's fragile estuaries, barrier islands, marshes and maritime forests. The Coastal Futures Committee has been charged with identifying the major management issues affecting the coastal region and developing a set of recommendations that will be presented to Gov. Hunt on Sept. 1.

Through a memorandum of understanding, the N.C. Department of the Environment, Health and Natural Resources, the UNC Institute of Government and the N.C. Coastal Federation have formed a partnership to implement the initiative. The N.C. Coastal Federation will provide partial staffing for the CFC, and will work to raise funds from the private sector to support the effort.

Events planned for this year include public meetings, media events, educational activities, contests and a national conference on coastal management issues to be held in Wilmington in August.

One of the main goals for the Year of the Coast subcommittee will be to involve citizens from diverse backgrounds in the project. All interested citizens are invited to participate.

For more information, contact Sandy Semans, The Year of the Coast, P.O. Box 4429, Emerald Isle, N.C. 28594.

*Genetic Tests Can't Distinguish Fish*

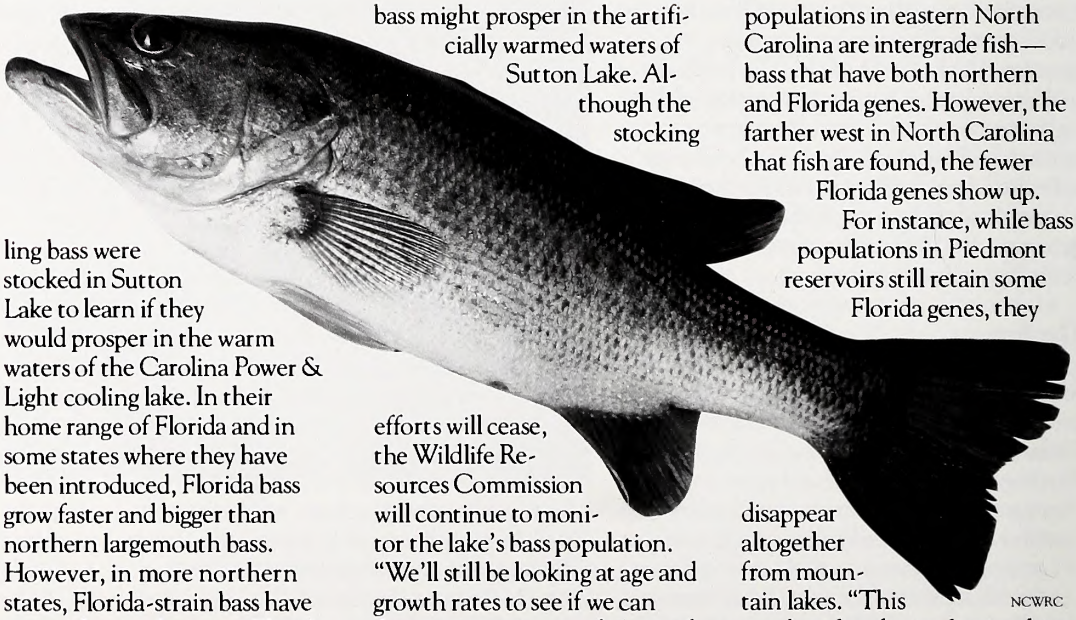
## Florida Bass Stocking Halted in Sutton Lake

A two-year-old project to introduce Florida strain largemouth bass to Sutton Lake near Wilmington has been cancelled because genetic testing revealed that the lake's native bass and the recently introduced Florida strain were too similar to each other to distinguish them from one another.

"The Florida bass and the native bass in Sutton Lake are so genetically similar that the genetic tests performed at Auburn University cannot distinguish between the two strains on an individual fish basis," explained Bennett Wynne, the N.C. Wildlife Resources Commission's biologist in charge of the project. "If we can't differentiate between the Florida and native fish, there is no way we can evaluate differences in survival, growth and condition."

In 1992 and 1993, approximately 140,000 Florida strain fingerling bass were stocked in Sutton Lake to learn if they would prosper in the warm waters of the Carolina Power & Light cooling lake. In their home range of Florida and in some states where they have been introduced, Florida bass grow faster and bigger than northern largemouth bass. However, in more northern states, Florida-strain bass have met with mixed success. Florida-strain bass are apparently much less tolerant of cold temperatures and survival is often poor in northern locales.

It was hoped that Florida-strain bass might prosper in the artificially warmed waters of Sutton Lake. Although the stocking efforts will cease, the Wildlife Resources Commission will continue to monitor the lake's bass population. "We'll still be looking at age and growth rates to see if we can detect a jump in growth rates of fish in the lake," Wynne added. "But there is no need to proceed as originally planned."



NCWRC

Research associated with the project revealed that most bass populations in eastern North Carolina are intergrade fish—bass that have both northern and Florida genes. However, the farther west in North Carolina that fish are found, the fewer Florida genes show up.

For instance, while bass populations in Piedmont reservoirs still retain some Florida genes, they disappear altogether from mountain lakes. "This may be related to earlier stocking sources for fingerlings," Wynne explained. Largemouth bass in North Carolina reservoirs have been stocked from a variety of sources in the past.

*For Small Landowners and Hunt Clubs*

## North Carolina Forestry Association Offers Liability Insurance

One of the chief reasons that private lands continue to be closed to hunting is because of fears landowners have about potential liability.

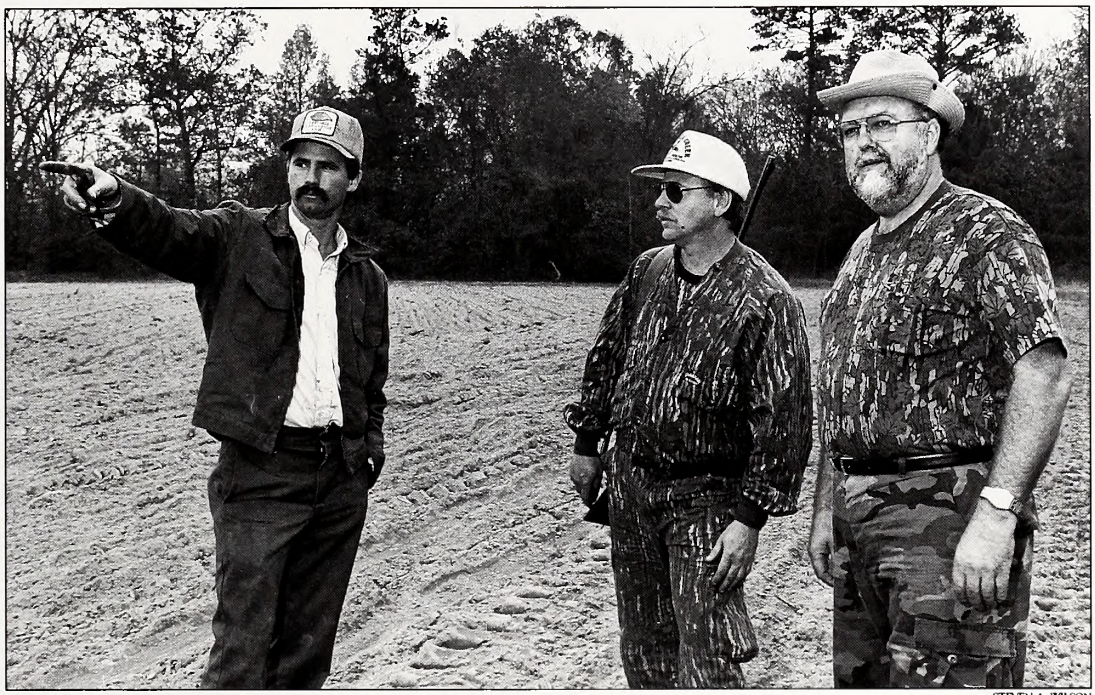
As a new initiative, the N.C. Forestry Association is now offering a hunting lease liability insurance package to members. The policy carries a $1 million liability limit with a $250 deductible. Hunting club guest liability coverage is also included in the policy.

The insurance package is designed primarily for North Carolina's small forest landowners and the hunt clubs that lease lands from members. Both the hunt club and the landowner must belong to the association to qualify.

"We are offering this insurance package to meet a definite need in North Carolina," said Bob Slocum, the executive vice president of the N.C. Forestry Association. "Private landowners are increasingly concerned about litigation when leasing land to hunters and hunt clubs, so much so that many were not allowing access to lands. And up to now it's been hard for both parties to find affordable insurance."

Land insured under the policy must be located in North Carolina. The program offers broad coverage, but the package is strictly hunting lease liability insurance and does not take the place of liability insurance unrelated to leased hunting activities. Fire related accidents are not covered. Activities such as commercial dove shoots and short-term fee hunting are not covered.

For more information or for a brochure, contact the North Carolina Forestry Association, 1600 Glenwood Avenue, Suite I, Raleigh, N.C. 27608-2355, or call 1-800-231-7723.



STEVEN A. WILSON

***A new package of** hunting lease liability insurance offered by the N.C. Forestry Association may make it easier for sportsmen to lease private lands. In the past, landowner fears about possible liability have closed private lands to hunting in many cases.*

*Your Boat or Trailer Might Be Culprit*

## Hydrilla Spreading Fast Across State's Waterways

Hydrilla continues to spread to lakes and waterways across North Carolina. Last fall, for instance, hydrilla was found near the Tunis boat ramp on Catherine Creek, a tributary of the popular Chowan River.

The introduced aquatic weed, which is native to Africa, can completely clog waterways and lakes, as well as displace or eliminate native plants and animals. Since its introduction to North American waters by the aquarium trade, it has become the bane of water resource managers.

"Hydrilla can take over small creeks and rivers to the point where they are not usable by anyone, including anglers, boaters, swimmers and skiers," said Pete Kornegay, the District 1 fisheries biologist for the N.C. Wildlife Resources Commission. "Because the weed growing was found near a boat ramp, we suspect the hydrilla was spread by boaters."

For this reason, anglers or boaters are being urged to carefully examine their boats and trailers when transporting boats to different waterways throughout the South. "No matter where they fish or go in-state, boaters should carefully check their trailers, boat and motors and remove all clinging aquatic vegetation," Kornegay advised. "Once hydrilla gets established in a waterway, it is very hard and expensive to control and almost impossible to eradicate."

Last year, more than $250,000 was spent in North Carolina to control burgeoning hydrilla populations. Hydrilla was recently found in Gaston, Kerr and Roanoke Rapids reservoirs. It is a federal and state offense to transport hydrilla and other listed noxious aquatic weeds from one waterway to another.

Kornegay warned that it is a mistake to believe hydrilla will improve fishing in a lake. In the early stages of infestation, angling success can improve because fish are concentrated along hydrilla growths. However, when infestation spreads and becomes severe, prey fish become inaccessible to gamefish and all fish eventually become inaccessible to anglers. Stunted fish populations are common in waterways with heavy hydrilla growth. It also clogs drainage ditches and pipes, irrigation equipment and water intake pipes.

*Book Review*

## Surf Fishing: Catching Fish from the Beach

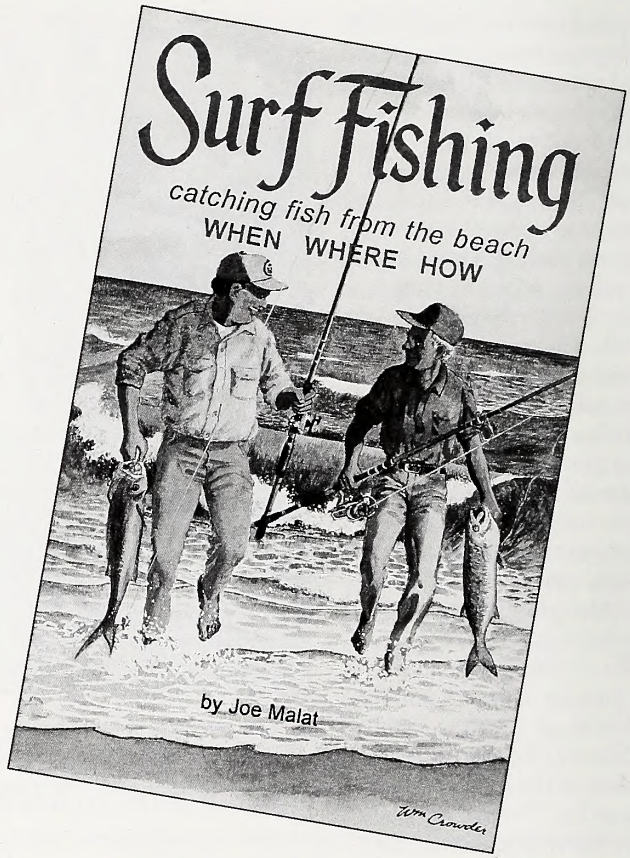
Surf Fishing: Catching Fish From the Beach—When, Where and How *by Joe Malat. Published by Wellspring, P.O. Box 3499, 2816 E. Market St., York, PA, 17402, 40 pp. $3.*

Joe Malat's new booklet will be sure to please anglers on their way to surf fish at the North Carolina coast. *Surf Fishing: Catching Fish From the Beach* details the principal fish that are likely to be encountered in the surf, the tactics and tackle needed to catch them and the time of year and general locations that offer best fishing for each species.

Although it's only 40 pages long, *Surf Fishing*'s conciseness is its very strength—you don't need to spend hours reading to learn a lot. The book makes use of excellent line drawings to illustrate lure types, rigging for terminal tackle and places to fish at inlets, sand bars and sloughs.

Also included are sections on catching and cutting bait; the effects of wind, tides and currents on fishing success; and a summary of catch-and-release ethics. Overall, the booklet is well-organized and clearly written.

Joe Malat is a long-time surf fisherman and has been a professional saltwater fishing guide on the Outer Banks. Although written mainly for the neophyte surf fisherman, the book has lots to offer experienced anglers, as well. And at $3 per copy, it's a super deal. Available at coastal tackleshops. The booklet is sized to fit inside most tackle boxes.




*Outstanding Achievement Applauded*

## N.C. Nature Conservancy Awarded

The Nature Conservancy's North Carolina Chapter was recently awarded the organization's 1993 Outstanding Program Award. The Conservancy's highest internal honor, the award is given to the program within the organization that has had the most outstanding performance in preserving natural diversity.

In fiscal year 1993, the North Carolina chapter protected 12,003 acres in North Carolina.

The Conservancy national office cited several of the chapter's achievements in presenting the award. "The North Carolina program has always been among the Conservancy's best, and this year, we recognize it as the best. During the last year, the program completed numerous land acquisition projects in support of its Roanoke River project, and added studies of neotropical migratory birds and ecological models to its analysis of the Roanoke River.

The North Carolina program is also currently managing successful partnerships for biological inventory and management for Dept. of Defense property at Ft. Bragg, and has upgraded its own biological monitoring work for globally rare species on lands in Conservancy ownership.

The protection of land at Grandfather Mountain was also cited. To date, the North Carolina chapter has protected 2,787 acres at Grandfather Mountain.

The Nature Conservancy is an international, non-profit membership organization committed to the preservation of endangered and threatened species. Since its inception in 1977, The Nature Conservancy's North Carolina chapter has protected over 337,000 acres in North Carolina with funds obtained from gifts and grants from foundations, corporations and its 17,000 members.

*Landed from Cape Fear River*

## New State Record Flathead Catfish Caught

A new state record flathead catfish weighing 67 pounds was landed this summer by angler Sam Honeycutt of Mamers.

Honeycutt was fishing with two friends, Lee Cockman and Otis Faircloth, at night on July 3 in the Cape Fear River near Lillington. The flathead bit the angler's cut bream bait about midnight.

"It took between half-hour to an hour to land it," he said. "We were fishing from the bank, but my friends helped us get the boat in the water so we could land it. When I got it in, I knew I better weigh it because it was bigger than anything I had caught before."

The 67-pound fish was 49 1/2-inches long and had a girth of 34 inches. The new record beat out the 62-pound, 7-ounce flathead landed by Royce Flippin in the Yadkin River in June 1987.

Honeycutt is an avid flathead angler and has caught a number of the big catfish in the Cape Fear in the past. He uses cut bait—usually bream—fished weighted on the bottom with a 12-foot surf rod and heavy spinning gear spooled with 30-pound test line. He usually eats the flatheads, but this one will probably go on the wall. "You need to soak them in salted water overnight to get rid of the muddy taste," Honeycutt added, "but once you do that they are one of the best-eating fish I've ever tasted."

*For a Few Dollars More*

## Upgrade Your Licenses Now

North Carolina sportsmen and women who purchased a lifetime comprehensive fishing or comprehensive hunting license may now upgrade those licenses to a lifetime sportsman's license under a policy recently adopted by the N.C. Wildlife Resources Commission.

These license holders can obtain the lifetime sportsman's license by paying the difference between the amount they paid for their lifetime comprehensive hunting or fishing licenses and the cost of the sportsman's license on the date it is purchased.

The cost of a lifetime comprehensive fishing or hunting license is $250. The lifetime sportsman's license fee for a resident is $500 and $1,000 for nonresidents.

Holders of lifetime sportsmans' licenses can hunt or fish for any game species in the state with the only additional cost being that of the Federal Migratory Waterfowl Stamp, commonly referred to as the Duck Stamp.

Monies from the sale of lifetime licenses go into the Wildlife Endowment Fund and only the interest can be used by the Wildlife Commission. The fund totalled $25,720,594.33 on May 31. It has generated more than $11.1 million in interest since 1981.

—*Bodie McDowell*

## Wildlife Endowment Fund Report

**October 1993**

Principal Balance
$18,876,120.00
Interest Earned
$12,560,930.00
Total Receipts
$31,437,050.00
Interest Used
$5,175,203.48
Fund Balance
$26,261,846.52

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.

## The 1994 North Carolina Wildlife Calendar Is Here!

***With such artwork*** *as Bob Dance's "Off the Banks" featured above, the North Carolina Wildlife Calendar is sure to sell out.*

The works of Robert C. Flowers, Jr., Dan Johnson, Ken Helser, Alan Cheek, Jake Taylor, Shannon Critcher Jones, Robert B. Dance, Bob Herr, Duane Raver, Mel Steele, James A. Brooks, and Dempsey Essick are featured in the 1994 Wildlife Calendar. Order yours today by returning the form below with your check or money order to 1994 Calendar, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

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*More People Fishing Than Ever*

## Outdoor Recreation Popular Nationwide

N.C. WILDLIFE RESOURCES COMMISSION

***Angling continues to** increase in popularity nationwide, as measured by a recent U.S. Fish and Wildlife Service survey. From 1985 to 1990, the number of anglers 6 years and older increased by 10 percent in the nation. Anglers spent $24 billion, or about $674 each in pursuit of this pastime.*

Hunting, fishing and bird-watching continue to rank among America's favorite pastimes, according to the recently-released 1991 National Survey of Fishing, Hunting and Wildlife-Associated Recreation.

The survey, conducted by the U.S. Fish and Wildlife Service, revealed that more than 108 million Americans 16 years or older participated in some recreational activity involving fish and wildlife, pumping $59 billion into the national economy through the purchases of equipment, travel, lodging and other goods and services.

Forty million Americans 16 years or older either hunted or fished during 1991, while 76.1 million enjoyed either nonconsumptive activities such as feeding, observing or photographing wildlife.

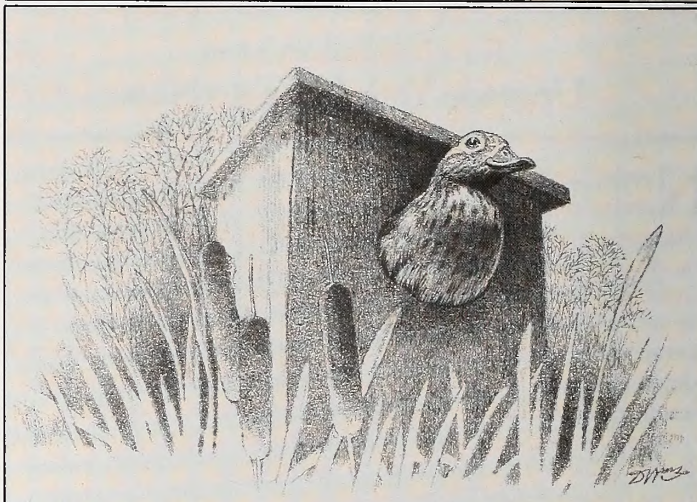
Anglers spent $24 billion, or an average of $674 each, and hunters spent $12 billion, or $851 each, on their sport. Another $5 billion in spending by hunters and anglers could not be attributed solely to one or the other sport.

Americans age 16 and older spent $18 billion to pursue nonconsumptive wildlife-related recreation in 1991.

Some of the results of the 1991 survey regarding expenditures are not directly comparable to the results of past surveys because the methodology was changed to improve accuracy. However, according to trends in the survey that are comparable, the number of anglers 6 years and older rose 10 percent from 1985 to 1990. The number of people hunting remained constant during that period.

The number of people 6 years and older who enjoyed wildlife observation, feeding and photography on trips away from home increased 9 percent from 1985 to 1990. However, the number of people enjoying these activities close to home decreased by 5 percent.





## Boxing Behavior

*by Vic Venters*

Wildlife management is an constantly evolving science, with new technology such as radio telemetry being used to add to our knowledge of wildlife behavior and biology. This new information is often used to refine existing management techniques. Wood duck box management is a good example. January is perhaps the best time of year to conduct annual wood duck box maintenance, before woodies begin searching for nests in late February and March.

Studies have proven that boxes that are cleaned out each year are used much more frequently than those that are not. This winter you should clean out old shavings, feathers, egg debris, wasp nests and other visible parasites. From observations, biologists recommend adding wood shaving for nesting material—cypress or cedar make good choices—instead of sawdust, which tends to clump up when wet.

If you're putting up a new box, be sure to place it at least 5 feet above water level. While research shows wood ducks will sometimes nest in boxes less than this height, they seem to prefer the higher level. We've stressed the importance of placing predator guards under your boxes before, but be sure the guards are placed well above water levels so that rising water doesn't allow raccoons or snakes to swim or crawl over the guards to raid the nests.

New research also indicates that wood duck boxes placed too close together can encourage egg dumping—several hens laying eggs in one box. Hen woodies are apparently attracted by the activity of other hens nesting in close proximity to each other. What often happens is that so many eggs get dumped in one box that none hatch. Recent studies indicate that you may get as much hatchling production from several well-spaced wood duck boxes as you would from many more boxes that are clumped together "condominium-style." Biologists are still researching the optimum distance between nest boxes, but available evidence indicates that you should place boxes at distances so that they are visually hidden from each other.

The salt marsh, nature's food factory, is worth protecting—one reason why 1994 has been named "Year of the Coast."

*For more information, see p. 28.*

## Guarding the Kill

A subadult goshawk, one of the three accipiters found in North Carolina, guards a meal of fresh squirrel. These woodland hawks can fly at full throttle through dense forest, frequently catching small birds on the wing.

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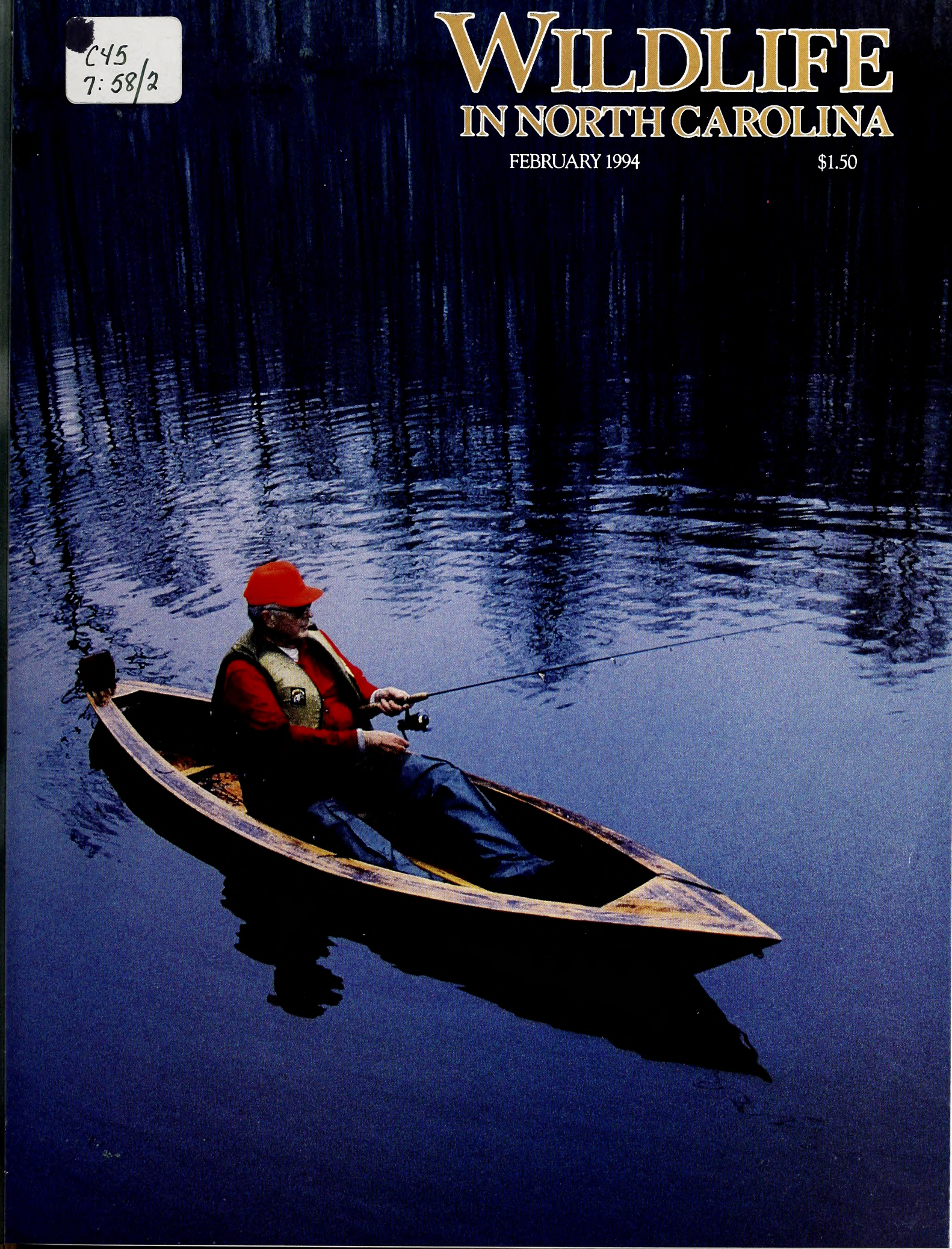
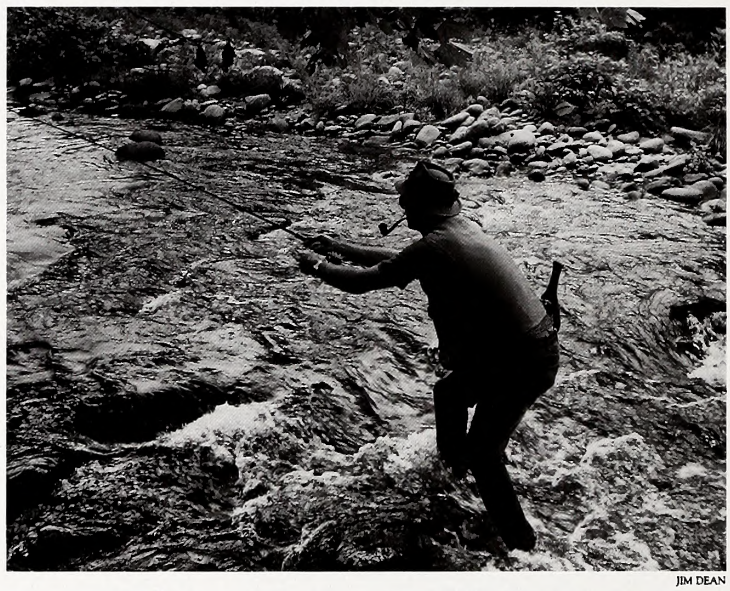


# Fly Fishing's Second Coming

*by Jim Dean*

It may come as a surprise to those who don't fish, but seeing all that graceful fly fishing in the movie adaptation of Norman McLean's novel, *A River Runs Through It*, did not thrill every trout fisherman. More than a few of my long-time angling friends left the theater filled with dread, apprehension and downright anger.

"We've been discovered," one said with trembling lips. "Worse than that, we've been betrayed. Our lovely, solitudinous sport has been sold for 30 pieces of silver, and our lifelong, anti-social obsession is being celebrated as a politically correct art form. Every fragile stream in the country could become a well-trod mall filled with nouveau fisherpersons wearing color-coordinated angling clothes and carrying outrageously priced fly rods and reels they don't know how to use. I think I'm going to barf."



JIM DEAN

I confess I've had similar misgivings. I turn on the TV and here's some guy using a fly rod to catch leaping loaves of bread out of a wheat field. Magazines are filled with ads featuring fly fishermen selling everything from computers and pin-striped suits to automobiles. *The Wall Street Journal* has proclaimed that fly fishing is "in." With hordes of instant experts thrashing favorite waters, is it any wonder a certain amount of antipathy exists? Of course, it's easy to poke fun at these newcomers collectively, but I'll admit that those I've met are very pleasant individuals who may prove more than willing to join us in the fight to protect fragile streams and other fisheries.

Still, there's no denying the fundamental changes that are taking place. The first golden age of fly fishing began in the last century and peaked in the early 1940s, but it began to wane with the growing use of bait-casting tackle, and particularly with the introduction of spinning reels from France after World War II.

For the next 20 years or so, fly fishing languished as a refuge for die-hard enthusiasts. In North Carolina, most fly fishing was seasonal for bluegills and bass, and salt-water fly fishing was virtually unheard of. Indeed, even on trout streams, fly fishermen were a decided minority, and almost all of them lived in the western part of the state where a single fledgling chapter of Trout Unlimited was formed in the 1960s. In the early 1970s, a well-advertised effort to launch a TU chapter in the Piedmont drew only five responses (two N.C. State students and three Ft. Bragg soldiers, all temporary residents who had imported their interest from elsewhere).

The 1960s and early '70s were perhaps the golden years for those who fished the 4,000 miles of trout streams in the western part of the state. Even on opening day each April, it was not unusual to hike into a superb wild trout stream and fish miles of water without seeing more than one or two other fishermen. From May through October, we had the streams virtually to ourselves, often even on weekends.

Fly fishing was largely a do-it-yourself hobby in those days. Quality bamboo rods were expensive—an Orvis Battenkill retailed for $150 (don't ask what such rods cost today). Fly-tying materials and other gear had to be mail-ordered, and choices were limited. We made nearly everything—our flies, wading shoes, tools and sometimes even our vests. We built rods from fiberglass blanks, and waded wet in old sneakers with carpet glued to the soles.

The development of shorter, lighter and more affordable hollow fiberglass rods in the 1950s and early '60s played a big role in fly fishing's renaissance, but it was the introduction of the first graphite fly rods by Fenwick in 1973 that really set the stage for today's booming enthusiasm. Even so, fly fishing remained a largely solitary pursuit until the 1980s. Since that time—and especially with the appearance of "The Movie"—it has grown in quantum leaps with the greatest impacts among trout and saltwater fishermen.

Given these vast changes, what advice might one give to a newcomer seeking acceptance or an oldtimer desperately protecting a heritage? It's a matter of style. Store your high-dollar rods, $400 reels, neoprene waders and designer vests. Dig that old yellow Eagle Claw glass rod and South Bend automatic out of the closet. Carry your flies—you really don't need many—in a Prince Albert can. Wade wet wearing a freebie fertilizer cap, coveralls and tennis shoes. Drink Old Milwaukee or steam whiskey and smoke, chew or dip—your choice. Drive a muddy old truck with an empty gun rack—let 'em guess where the gun is. Pile the dash with abandoned pork rind bags, fly-specked potted meat cans and paint-cracked popping bugs.

That Eagle Claw will catch those wild browns if you know what you're doing—you just need a little more uncontested water. If you're lucky, some of your less adventurous competition will also recall seeing another influential movie. You remember *Deliverance*, don't you?

*February, 1994*
*Volume 58, Number 2*

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **Partners in Flight** *written by Lawrence S. Earley*
*photographed by Steve Maslowski* © 1994
*The very survival of many of our favorite songbirds—indeed all neotropical migrants—may rest on the success of this cooperative effort.*

10 **Counting All Calls** *by Eddie Nickens* © 1994
*Each June, thousands of volunteers arise before dawn to listen for bird calls in lonely vigils along roads all across the United States. Together, they chart the long-term population trends of our beleaguered birds.*

14 **Are Pesticides Harming Quail?** *written by Vic Venters*
*photographed by Melissa McGaw*
*At long last, biologists are beginning to learn more about the relationship between bobwhite populations and pesticide use on modern farms.*

20 **Soda Crackers or Slabs?** *by Scott Van Horn*
*Given half a chance, crappies will eat and reproduce themselves into an overpopulated, cracker-sized bunch of runts, but biologists know how to apply the right prescription to grow those slab-sided fish you prefer.*

24 **Regarding Groundhogs** *written by David S. Lee* © 1994
*photographed by Len Rue, Jr.* © 1994
*You may be sick of prognosticating whistlepigs from Punxsutawney every February, but these big ground-dwelling squirrels—and their shadows—are here to stay.*

N.C. DOCUMENTS CLEARINGHOUSE

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*
**Nature's Ways** *by Lawrence S. Earley*
**Back of the Book** *by Vic Venters*
**Wildlife Through the Year** *by Vic Venters*

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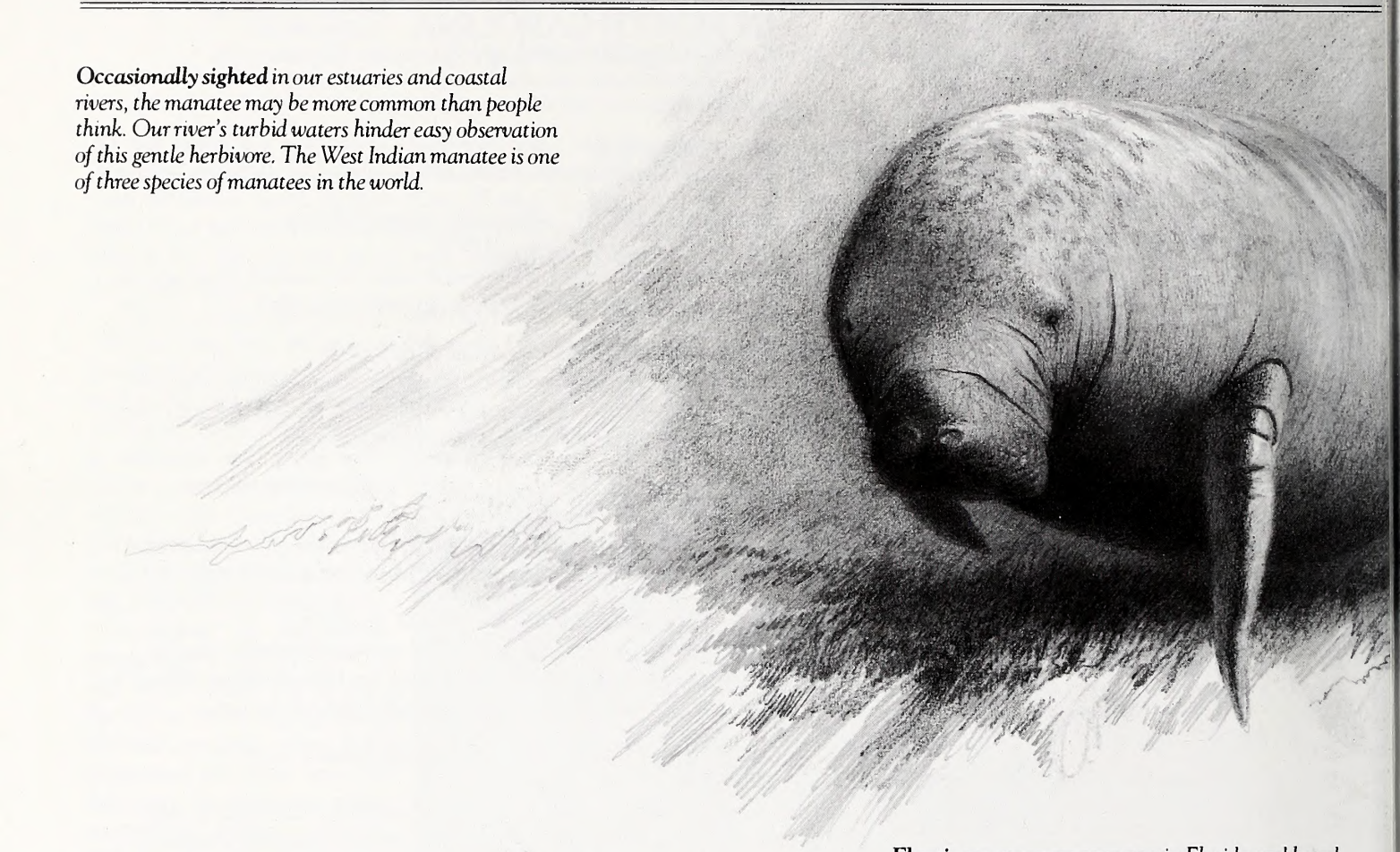
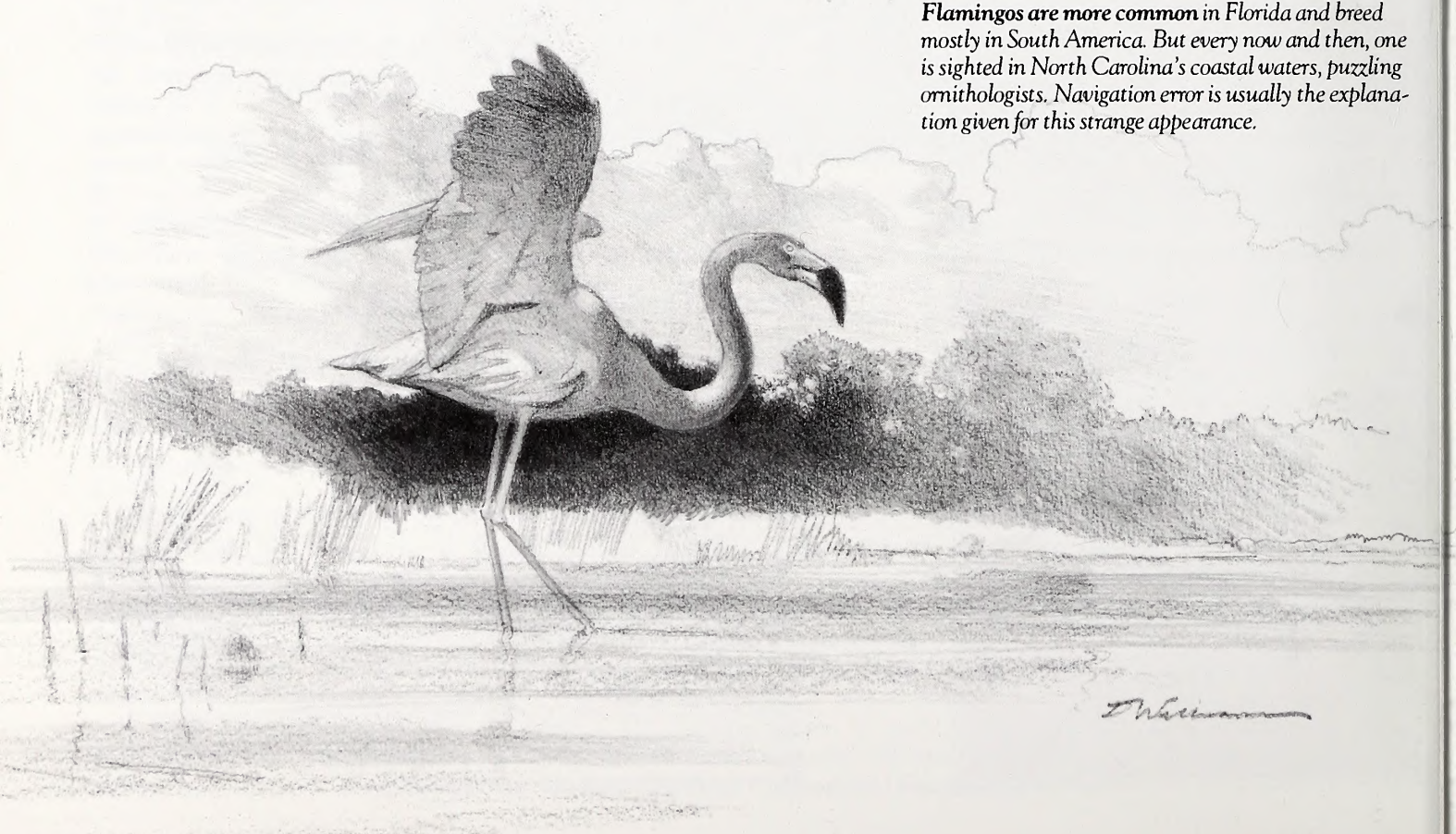
**Cover** *Bill Hinnant tries his luck for crappies in an old millpond on a wintry day. Photographed by F. Eugene Hester.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**



**Occasionally sighted** *in our estuaries and coastal rivers, the manatee may be more common than people think. Our river's turbid waters hinder easy observation of this gentle herbivore. The West Indian manatee is one of three species of manatees in the world.*



***Flamingos are more common*** *in Florida and breed mostly in South America. But every now and then, one is sighted in North Carolina's coastal waters, puzzling ornithologists. Navigation error is usually the explanation given for this strange appearance.*

# Uncommon Coastal Visitors

*written by Lawrence S. Earley/illustrated by David Williams*

Most animals that we see in North Carolina belong here. They are part of a community consisting of other animals and living organisms that they eat. Adapted to the climate of a particular region and its food resources, they survive because they can compete with other animals that live there, too.

Sometimes, however, an animal that we see is so rare that we might even say that it doesn't belong here at all. Some exotic animals are released by people who no longer want them, or the animals escape from captivity. Others are here accidentally because they made an error in navigation, were blown off course, or because they were sick or injured. Still others are here because North Carolina is at an extreme of their range. They are here, but just barely.

Here are a few of the most uncommon visitors in the coastal region of North Carolina:

**West Indian Manatee** (*Trichechus manatus*). The manatee occasionally wanders into estuarine and freshwater coastal waters, although the center of its range in the United States is Florida. This aquatic mammal can weigh more than half a ton and stretch as much as 13 feet in length, yet relatively few have been observed here. Possibly more occur here than we know. Our silt-choked rivers prevent good viewing, especially compared to the clear Florida waters where mother manatees and their calves are often photographed.

The gentle manatee is an herbivore, grazing on floating or submerged grasses. It is a federally listed endangered species today. An extinct relative, the Steller's sea cow, was extirpated by fur hunters within 30 years of its discovery in the 18th century.

**Wood Stork** (*Mycteria americana*). This endangered species is altogether uncommon throughout the state. But each year, from June to September, about 25 to 30 of the birds disperse north after breeding in South Carolina and settle in two ponds at Sunset Beach in the extreme southeastern corner of Brunswick County. They prefer to fish in shallow freshwater ponds, swinging their heads from side to side to catch small fish, reptiles and amphibians.

**Flamingo** (*Phoenicopterus spp.*). Most flamingos seen in North Carolina are made of plastic and stand stiffly on lawns. The real ones are native to South America, and North America—much less North Carolina—is normally far out of their range. Yet sightings of flamingos—sometimes even the Chilean flamingo of central and southern South America—are regularly reported to the Museum of Natural Sciences in Raleigh. Ornithologists there are puzzled by the birds' presence here. It may be that they are here as a result of a navigational error the flamingo makes on its annual migration.

**Harbor seal** (*Phoca vitulina*). Sick or injured harbor seals are sometimes recovered in our coastal waters, but no more than three to 10 a year. Their habitat is the colder waters off Canada and Greenland, but they wander into this region from time to time. They are fish eaters, although they also eat squid and other marine foods.

**Roseate spoonbill** (*Ajaia ajaja*). Just a few records of this bird with the broad bill exist in North Carolina. Evidently, after dispersing from its breeding ground in Florida, an individual or two with an advanced case of wanderlust has appeared, feeding on crustaceans and small fish in our summer salt marshes.

***Every year, a small band** of wood storks makes its appearance in Brunswick County, the only place in the state where they are found. The storks appear after breeding in South Carolina and before their migration south for the winter.*

# Partners in Flight

The very survival of many of our favorite songbirds—indeed all neotropical migrants—may rest on the success of this cooperative effort.

written by Lawrence S. Earley
photographed by Steve Maslowski © 1994

To understand why an international organization called Partners in Flight is necessary, it might help to consider the twice-yearly travels of a half-ounce package of bone, muscle and feathers called the cerulean warbler.

This bird isn't very different from the 100 other warblers, vireos, flycatchers and other songbird species in North Carolina (200 in the United States) that spend their winter months in the tropics, earning them their name, neotropical migrants. Like them, the cerulean warbler will begin an improbable journey in the next month that will take it from the evergreen forests of the Andean foothills to breeding grounds along North Carolina's Roanoke River. It will slowly make its way north, flying at night four to eight hours at a time, resting and feeding for a few days in between flights. On reaching the Gulf of Mexico, it will rest again and then fly for almost 24 hours across the Gulf before making landfall in Louisiana. Following its inner compass northeast now, it will arrive at the rich bottomland forests of the Roanoke by late April and stay here through the spring and summer. In the fall, it will repeat the journey, this time from north to south.

The chances are pretty good, however, that the cerulean warbler will never complete one or the other of these journeys. That's because migration is hard on birds, especially the small ones. A host of terrors await a neotropical migrant. It may be eaten by another migrant, a hawk perhaps. It may fly into a

***The Kentucky warbler** (left) and cerulean warbler (right) are two of many neotropical migrants whose populations are in serious trouble. Habitat changes in the United States and South and Central America are blamed, conditions that Partners in Flight seeks to reverse.*

*"The goal of* Partners in Flight - Aves de las Americas *(PIF) is to maintain, restore, and enhance populations of wild bird species that breed in the United States and Canada and migrate to Mexico, Central America, South America, and the Caribbean Basin during the northern winter (i.e., neotropical migrants)."*

—Partners in Flight charter

radio or TV tower and be killed. It may be blown off course by strong winds and drop exhausted into the sea, a morsel for a scavenging gull. (A quarter million dead birds were washed up along the coast of Texas in 1982 after a severe storm struck during a migration.) An orientation error may lead it out to sea, rather than onto land.

Yet as perilous as migration is to the cerulean warbler and other neotropical migrants, no one would have ever formed a group called Partners in Flight to call attention to its hazards. There would have been no conferences calling for an unprecedented effort to address the situation, no studies, no initiatives, no alarm.

What scientists have discovered, however, makes the alarm inevitable and Partners in Flight necessary. For humankind has hung the equivalent of an anvil around the necks of this little migrant and its kin, considerably dimming their chances of survival.

The evidence of this was beginning to be clear as early as 1980 when birders and scientists first began to discuss the troubling possibility that neotropical migrants were disappearing from forests and grasslands where they were once common. Data from bird counts conducted annually as part of the North American Breeding Bird Survey (see "Counting All Calls," p. 10) showed that a large number of species in eastern North America had undergone a steep decline over the previous 20 years, with a big drop occurring from 1978 to 1987. These downward trends were confirmed by readings of weather radar images of bird migrations across the Gulf of Mexico indicating that the number of flights had decreased by half between the 1960s and the 1980s.

At first, scientists blamed the decline of songbirds on the devastating deforestation of tropical rainforests in South and Central America. In these countries millions of acres of forest have gone up in smoke as land has been cleared for sugarcane fields, cattle ranches, coffee fields and banana plantations. Duke University professor John Terborgh, author of *Where Have All the Birds Gone?*, has visited 80 locations in more than 15 countries over the last two decades and has seen many of his study sites disappear. "Practically every research site that I used in the first 10 or 15 years of my career no longer exists as a biological locality," he says. "I feel like a refugee."

But Terborgh also points out that the problems aren't confined to the tropics. North American habitat has been disappearing, too. A wave of development from the 1950s to the 1980s has eliminated vast areas of wetlands and other prime breeding grounds of the tiny migrants (See "Wanderers in Trouble," November 1989). Habitat that remains is often fragmented into smaller pieces that cannot support former bird populations. And these habitat fragments make the nests of neotropical migrants more vulnerable to predators (raccoons, house cats) entering from the edge, and to nest parasites like the brown-headed cowbird.

Terborgh hurled a challenge in his slim book to all who would listen. "If we are going to do something to prevent [the disappearance of birds], we shall have to do it soon. The

***The dutiful wood thrush parent** will feed all of the young in its nest, even the bigger cowbird chick (with red mouth). The cowbird was hatched from an egg laid by its parent, which builds no nest of its own. The brown-headed cowbird, a nest parasite, is thought to be a major reason why many neotropical bird species like the wood thrush are declining.*

year 2000 will be too late." What was needed was action, but on a vast, international scale.

***Enter Partners in Flight.*** Organized in 1990 as part of the National Fish and Wildlife Foundation's Neotropical Migratory Bird Conservation Initiative, Partners in Flight seeks to reverse the downward spiral of neotropical and other songbirds by combining the resources of public and private organizations in North America, Latin America and the Caribbean. A counterpart to the North American Waterfowl Plan, Partners in Flight aims to restore neotropical songbird populations by protecting breeding and winter habitats, and improving management practices on public and private lands.

The key is cooperation. Partners in Flight consists of public agencies and private conservation groups that have decided to focus attention on neotropical songbirds. So far more than a dozen federal agencies, all 50 state wildlife agencies, and more than 20 private conservation groups, have enlisted in the effort.

Many of the participating agencies have devoted considerable resources to the initiative, an enormous achievement in these times of lean budgets. The National Fish and Wildlife Foundation has committed nearly $1.3 million in matching grants to 48 research projects.

To encourage researchers to cooperate beyond their state boundaries, Partners in Flight has organized the country into a variety of regions and smaller, multi-state physiographic areas within regions. "Organizing in this way has encouraged states to work together to share their resources as opposed to going it alone," says Chuck Hunter, a biologist with the U.S. Fish and Wildlife Service and a technical assistant with the Southeast Partners in Flight working group. "It also makes good ecological sense." North Carolina's mountainous Blue Ridge province, for example, is shared by four other states—Virginia, South Carolina, Tennessee and Georgia—and ongoing work in this area involves researchers from all of these states.

Other objectives of Partners in Flight include encouraging a landscape-wide perspective among researchers and integrated management programs among land managers. "There are so many kinds of birds and so many threats to bird populations, that it will take a big, landscape-scale approach to solve them," explains Allen Boynton, nongame biologist with the N.C. Wildlife Resources Commission and the coordinator of North Carolina Partners in Flight. Although many bird species are restricted to particular habitats, migrant birds are found in every habitat in the state, even highly modified ones like the shade trees of older residential developments, he says. Thus knowing the condition and distribution of habitats is essential to having healthy populations of all migrant songbirds in North Carolina.

"The first step is to map songbird habitats and assess their relative value and condition," says Boynton. "For example, is the range of mature mountain cove forests declining, increasing or becoming more fragmented? Only with a landscape-scale approach can we assess threats to the state's songbird populations and provide the variety of habitats needed by songbirds through time."

***A model research study***—involving cooperation among public and private organizations, a broad, landscape perspective and integrated management objectives—was recently completed on the Roanoke River. Funded by the National Fish and Wildlife Foundation through a matching grant with the North Carolina office of The Nature Conservancy, the study was conducted by Jaime Collazo and Jeff Walters of North Carolina State University during the 1992 and 1993 breeding seasons.

The Roanoke River is one of the last of the great bottomland forest ecosystems left in the Southeast, a legendary habitat for game species like wintering waterfowl, wild turkey and herds of white-tailed deer. While the landscape surrounding the Roanoke is a patchwork of small woodlots, farms and small towns, the Roanoke floodplain provides a vast and diverse forested habitat, perfect for

## What You Can Do for Songbirds

- Take part in the second meeting of North Carolina Partners in Flight in Southern Pines on March 18 and 19. On May 17 and 18, another meeting will be held in Little Switzerland for land managers in the Blue Ridge province. For more information, and for a free copy of the North Carolina Partners in Flight newsletter, write: The Nongame and Endangered Species Program, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.
- Hold a local homeowners meeting and declare your neighborhood a sanctuary for migratory songbirds. Move on to the next neighborhood, and the next!
- Participate in land stewardship programs through the National Wildlife Federation's Backyard Habitat Program (write: Urban Wildlife, National Wildlife Federation, 1400 Sixteenth St., NW., Washington, D.C. 20036-2266); the U.S. Forest Service's Forest Stewardship Program (write the Forest Stewardship Coordinator, Archdale Building, Box 27687, Raleigh, N.C. 27611-7687; or the U.S. Fish and Wildlife Service's Partners for Wildlife Program (Partners for Wildlife Coordinator, U.S. Fish and Wildlife Service, P.O. Box 33726, Raleigh, N.C. 27636-3726).
- Contribute to the North Carolina nongame and endangered species tax-checkoff program. Your contributions really do make a difference.
- Support conservation organizations like The Nature Conservancy that preserve large, intact ecosystems and promote sustainable use of unprotected forest land.
- Read "Save the Birds: A Guide to Neotropical Migratory Bird Conservation," an informative brochure presenting dozens of bird conservation opportunities in the backyard or in the ecosystem. Available from the National Fish and Wildlife Foundation, 1120 Connecticut Ave., NW, Suite 900, Washington, D.C. 20036.
- Send for a free copy of *Partners in Flight Newsletter* which includes plans, progress reports, resource listings, and a roster of contacts in government agencies and conservation organzations. Write the National Fish and Wildlife Foundation (see address above).

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*Some information was taken from the Information and Education Working group newsletter, published by the National Fish and Wildlife Foundation.*

*Prothonotary warbler*

neotropical breeding bird activity.

"We've always known about the density and diversity of breeding bird fauna along the Roanoke," explains Merrill Lynch, protection specialist with the Conservancy. "We wanted some baseline information so that we could produce an integrated management plan for all the entities who were managing bottomland hardwoods on the river." He added, "If we can understand what neotropical birds need, we can manage for that."

The partners in this effort, all land managers along the Roanoke, are the Conservancy, the Wildlife Commission and the Fish and Wildlife Service. The Conservancy has helped acquire lands for the Commission's Roanoke River Wetlands and the FWS's Roanoke River National Wildlife Refuge, which comprise about 26,000 acres of bottomland hardwood forest. All three organizations are looking for ways to manage their lands for the broadest diversity of wildlife species, including neotropical migrants. Also involved in the study were numbers of farmers and timber companies whose land was used in the study.

Studying the factors behind neotropical bird declines is a complicated undertaking, explains Collazo about his and Walter's study. "First of all, not all neotropical songbirds are declining. Populations of indigo buntings are not decreasing at all." And then simply counting the number of bird species and correlating it with habitat features is not sufficient. "We have to look at what's actually going on. How many birds are being produced? How many are surviving and dispersing to colonize other habitats?"

***The scarlet tanager** is another neotropical migrant whose populations have fallen in North Carolina over the past decade, although its breeding range has widened. Once a mountain and Piedmont species, it has been found nesting recently in several Coastal Plain counties.*

Walters adds that though deforestation in the wintering grounds and fragmentation in the breeding grounds have been blamed for the plight of neotropicals, it's not certain which problem is limiting the birds more. "It could be that there's an overabundance of wintering habitat and that eliminating half of it wouldn't affect the birds in the least. Or it could be that changes in the forests in the tropics are decimating bird numbers so they can't fill up the breeding grounds. We don't understand the population biology even of a single species to know for sure what's happening."

Walters notes that answers to these questions will be useful in fashioning a management strategy that could possibly offset the effects of habitat fragmentation. Indeed, it was the practical applications of the Roanoke River study that interested the two agencies and the Conservancy from the start. All three groups will sit on a panel to weigh the preliminary data from the study and make recommendations about forest management activities on agency-owned Roanoke lands. The researchers have identified more than 90 breeding bird species in their 100-mile study area, indicating the richness of the Roanoke for bird populations. One outcome of the study already has clear management implications. "We know that Swainson's warblers and Kentucky warblers need areas with lots of cane in which to nest," says Lynch, "so we know we have to manage for cane to give these birds a boost. The study quantified our theories and ideas. We didn't have the data before. We do now."

Another study attempting to unlock the secrets of the neotropical migrant decline is funded by the National Park Service in the Great Smoky Mountains National Park. Researchers there are studying the role that old-growth forests in the park play for neotropical migrants in the largest piece of contiguous forest in the Eastern United States. Regional group meetings organized by Partners in Flight have provided a structure for researchers in various parts of the Southeast to share information and even work together, says Ted Simons, formerly with the Park Service and now with the National Biological Survey. "Some of us have jointly proposed a larger landscape-scale study to look on a regional basis at some of the same questions that we're all looking at individually," he says.

***But there's more to*** Partners in Flight than research. Though the group was organized initially at the national and even international level, state groups are now bringing a concern for birds down to the local level. The North Carolina Partners in Flight is just forming, says Allen Boynton. Like its national parent, North Carolina Partners in Flight aims at facilitating songbird conservation within the state. "It's not a closed group at all," Boynton says. "Participation is open to everybody." The group's first meeting in September drew 53 people from government agencies, forest products companies, utility companies and conservation groups like the Ocracoke Preservation Society. A second meeting is planned for March (see "What You Can Do for Neotropicals").

"I see one of the roles of the state Partners in Flight as making land managers aware of songbirds and their needs," says Boynton, "and helping them integrate songbird conservation into their existing conservation programs. I'd like to see the group point out management options that would help neotropical migrants and other songbirds, and then let land owners make their own decisions about what to do."

Even deer management plans can benefit songbirds, adds Boynton. An unregulated herd can strip a forest of its undergrowth, hampering Kentucky warblers and other neotropical migrants that feed and nest there. Thus keeping deer herds at reasonable levels is good for the deer and good for some neotropical migrants.

North Carolina's Forest Stewardship Program can help landowners plan a management strategy that can embrace both deer and songbirds. This program offers coordinated advice from a variety of professionals on forest management, wildlife management and the protection of soil and water. "These programs can work with a landowner on a


## You Make a Difference!

NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

Your donations to the Nongame and Endangered Species Program mean that many endangered species have a chance for survival. Please keep giving. Make your contribution through the state income tax checkoff or directly to the Nongame & Endangered Wildlife Fund, N. C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N. C. 27604-1188.

***The great-crested flycatcher*** *often uses the cast skin of a snake as nesting material. Naturalists are not sure why. Partners in Flight seeks to restore the populations of the flycatcher and other neotropical migrants to their former levels.*

specific location, taking into consideration his or her objectives," says Chuck Hunter of the Fish and Wildlife Service. "Once we have an understanding of specific landscapes and the objectives of the manager, then we can offer specific guidance."

One of the consequences of this kind of integrated management on private and public lands would be to link different kinds of groups—sportsmen, birdwatchers, agencies and conservation organizations—that have not often worked together. "It's important that people understand that North Carolina Partners in Flight has no regulatory authority," says Boynton. "Our primary purpose is to bring the needs of songbirds to the attention of landowners and public agencies, including my own. Many landowners know that songbirds are an important part of the system. But they don't know that much about the birds, their habitat needs and their population trends. I hope our group will focus primarily on communicating that information."

The best hope for the cerulean warbler and its neotropical kin may well lie with Partners in Flight and a supportive public. If neotropical migrants are to survive the loss and fragmentation of their habitats, a coordinated effort will be necessary. Partners in Flight has already proven it's ready to lead.

# Counting All Calls

Each June, thousands of volunteers arise before dawn to listen for bird calls in lonely vigils along roads all across the United States. Together, they chart the long-term population trends of our beleaguered birds.

by Eddie Nickens © 1994

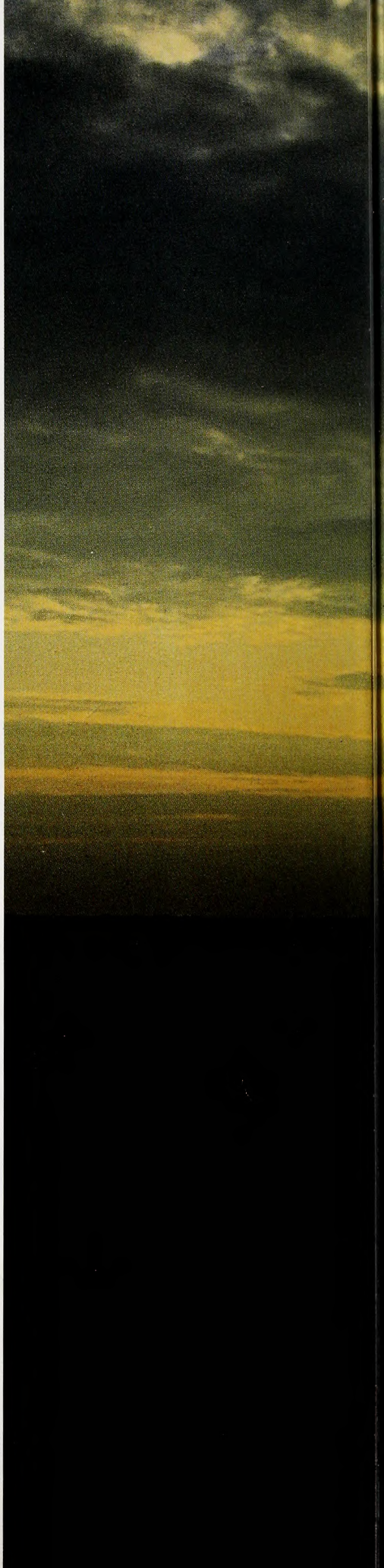
Right hand cupped behind an ear, left hand gripping a clipboard, Harry LeGrand stands alone in the middle of the road. It is a few minutes before an early June sunrise on a nondescript rural two-lane in Franklin County, and the sky is blue-black, just beginning to lighten. Already the stars in the east have disappeared, though a quarter-mile away a car's taillights still carve a red arc around the bend in the road.

LeGrand, an environmental specialist with the N.C. Natural Heritage Program, is oblivious to these surroundings. It isn't that his mind is wandering, for his focus is nearly palpable. Binoculars dangling from his neck, hand behind his ear, he pirouettes in slow-motion, spinning around on the blacktop. He closes one eye, opens it, his brow furrowed. He is a man in complete concentration, a man in tune with his surroundings, a man who, well, quite honestly, at this moment is listening to waking birds.

"Chipping sparrow. Carolina wren. Towhee. Wood thrush," he says, then hesitates, lips pursed. "Need a goatsucker," he adds, continuing his ornithological litany. "Cardinal, quail, indigo bunting." LeGrand checks his watch, chews on his lip, and then suddenly strides back toward the car. Whatever he's doing, he's finished, at least for the moment.

Each spring, a certain June dawn finds Harry LeGrand prowling the backroads of Franklin County from just before sunrise to mid-morning. In the glow of rural streetlights and the glare of sun-drenched farm fields, LeGrand stares into woodlots and across pastures, scribbling in his notebook, pursing his lips, wrinkling his brow, walking with his hands cupped behind his ears. Farmers on tractors, children on schoolbuses, unseen faces behind windows in homes along the roadside all watch the indefatigable LeGrand, turning circles in the road, perched on bridge crossings, glassing the sky from the seat of his car. No doubt, all are asking themselves the same question: What is that man doing?

The answer isn't sinister, but it is intriguing. LeGrand is acting as a sort of auditory snoop for the U.S. Fish and Wildlife Service's annual Breeding Bird Survey, or "BBS." Each June across North America, volunteers such as LeGrand take part in an extensive counting of birds along thousands of pre-determined, 24.5-mile routes that lace the United States. At exactly one-half hour before sunrise, BBS volunteers begin their survey route at stop No. 1, marked on a map supplied by the U.S. Fish and Wildlife Service. The volun-



***Against a rose-colored** Franklin County sunrise, Harry LeGrand identifies bird species by listening for their breeding songs. He and other volunteers perform this rite each spring for the Breeding Bird Survey, an important index of songbird populations in the United States.*

MELISSA McGAW

MELISSA McGAW

***Terry Sharpe listens** for dove and quail calls during a 20-stop count of mourning doves and bobwhite quail that is conducted each spring by Wildlife Commission biologists. Surveys like this help biologists understand the long-term population trends of these two species.*

teers look and listen for exactly three minutes, noting every bird seen or heard within a quarter-mile of the stop. After the three minutes are up, it's back into the car for a short dash to the next stop, where the process is repeated. For 25 stops and 24.5 miles, these avid birders stop, look and listen, and in the process help to build one of the most impressive and important databases of wildlife population statistics in the world.

The BBS was an outgrowth of the *Silent Spring* era, says Bruce Peterjohn, BBS coordinator for the U.S. Fish and Wildlife Service. Rachel Carson's 1962 book prompted nationwide concern over the indiscriminate use of pesticides and DDT's effects on bird populations, but there was little data available regarding overall bird populations and trends. To fill that void, a survey was designed to provide baseline data on bird numbers using singing males in the springtime as a mechanism for tracking population losses and gains. In 1965, 50 trial routes were run in Maryland and 10 in Delaware. Today, routes are run in every state except Hawaii and across Canada. In 1993, some 25 surveys were conducted in Mexico, part of a three-year study to evaluate the feasibility of expanding the BBS across the rest of the North American continent. Today, according to Peterjohn, the BBS is the only source of long-term population data available for all bird species on a continental and regional level.

The BBS is designed with an emphasis on numbers of individual birds rather than the number of species, LeGrand says, because the survey looks critically at population trends. That's why it's so important to find dedicated BBS volunteers, because better data is obtained when routes are run by the same person year after year. "Sometimes I'd rather be doing a different route, but that's not the way the program is designed," LeGrand explains. "If I do this route this year and you run it next year, the data might change simply because you might tend to hear differently from the way I do."

Indeed, the preciseness with which the BBS volunteers survey their route is one important factor in the program's success. The goal of the survey is to establish a comparison index, not an actual count or census, and rigid rules are followed to maintain the statistical integrity of the survey. While it's tempting to stay longer at some stops because a surveyor might think there's a "good" bird out there that has yet to be identified, the rules of the survey shouldn't be bent, LeGrand says. Surveyors are allowed to move one-tenth of a mile if loud noise such as traffic or farm machinery impedes the count, and a few seconds can be added to the stop in the case of significant noise pollution. Otherwise, the routes are unchanged from year to year to provide an accurate

accounting of habitat changes.

It would be easy—and a whole lot more fun—to confine call routes to marshes, creeksides and mature forests, where many birds and many bird species congregate, but the BBS is designed to give an accounting of population trends, so negative data is as valuable as positive data. At times it's frustrating, LeGrand says, when he has to pull up to a listening station only to discover that last year's field is this year's front yard, or a favorite stand of trees is now a bramble-choked cutover. "I'd love to have a creek or bridge crossing every third stop," LeGrand says, "but it doesn't always work out that way." Nor do most of the routes traverse through wildlife refuges and national parks. Granted, birding in such areas is good, but most parts of the country are divvied up by country highways, pocked with crossroads and shopping centers and clearcuts. To get accurate trend data, surveyors are sent to ordinary backroads America.

These efforts add up to an extraordinary network of data, part of a multi-tiered research program that comprises a great ornithological web of information that is set each spring across the country. And the BBS is but one of the long-term, birdsong-based research programs that attempts to assess the status of birds in North America each spring. In addition to the BBS are the following programs:

**The Breeding Bird Census** is designed to give detailed information about bird use on smaller plots of land than those assessed on BBS routes. For each census, a specific plot of land of 10 to 12 hectares (about 25 to 30 acres) is surveyed eight to 10 times during the breeding season. In particular, the territories of singing male birds are mapped out over the course of the visits, and at the end of the project the number of territories of each species of singing male are counted, a figure that should correspond to the number of breeding pairs. This data is then sent to the Cornell Laboratory of Ornithology in Ithaca, N.Y., and each year's Breeding Bird Census is published in the *Journal of Field Ornithology*.

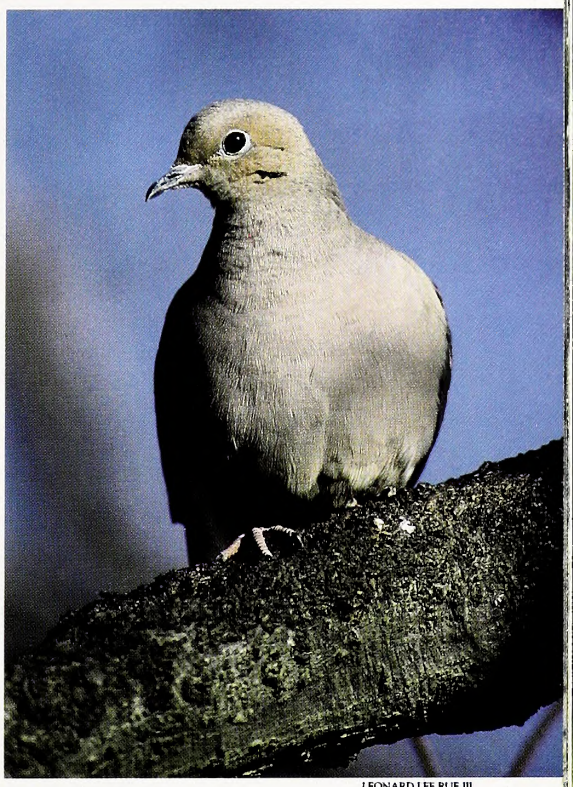
The Census differs from the Breeding Bird Survey, says Haven Wiley, a professor of biology at UNC-Chapel Hill, in that an actual count of breeding birds per acre is amassed. "The Breeding Bird Census gives you more detailed information on densities of birds, rather than overall numbers of birds," Wiley says.

New census takers are always needed for the Breeding Bird Census program, but individuals should recognize the time commitment and birding experience required. You don't have to be a professional bird biologist to take part, but census-takers must be able to identify birds by sight and vocalization, and be willing to spend at least eight to 10 mornings in the springtime months collecting data. Afterward, maps must be collated and sent to the Cornell Laboratory of Ornithology. For information on involvement with North Carolina's Breeding Bird Census program, contact Dr. Haven Wiley, Department of Biology, UNC-Chapel Hill, Chapel Hill, N.C. 27599-3280.

**The Breeding Bird Atlas** program is an attempt to map geographical distribution of bird species on a state-by-state basis. This past year researchers with the state's Museum of Natural Sciences completed six years of fieldwork for a Breeding Bird Atlas of North Carolina. Dividing the state into nine-square-mile blocks, block numbers were literally drawn from a hat to ensure a random selection, then each block was surveyed—500 in all—for species diversity during the breeding season. Researchers returned to the quadrants as often as possible, compiling a detailed list of all species of breeding birds found. Now comes the tough part: turning numbers into color-coded maps of specific ranges for all the species. The Atlas, says the museum's John Gerwin, turned up needed new data on lesser-known species such as barn owls, black-capped chickadees and loggerhead shrikes, and will prove a valuable baseline for researchers in the future.

**Mourning Dove and Quail Call Counts** are also conducted by the N.C. Wildlife Resources Commission during the spring. The dove surveys, coordinated by the Fish and Wildlife Service, are 20-stop routes with stops spaced at one-mile intervals; quail surveys boast an additional stop. Commission biologists and other personnel handle the surveying duties, which take place in late May and June. The information gathered is used to develop long-term population trend data and to help wildlife managers set hunting seasons and bag limits. Unfortunately, says Terry Sharpe, the Commission's small-game project leader, the dove and quail call counts have led to disturbing discoveries, particularly concerning North Carolina's quail populations. The 1992 statewide average for quail calls during the count was 1.11 birds per stop, down some 50 percent over the long-term average. Part of the explanation, Sharpe says, is easy to figure for those on the road during the surveys. "Things have changed a lot, I can tell you that," Sharpe says. "We have to run many of our routes on Sunday mornings now because traffic noise is so bad during the rest of the week. Suburbia has taken over the state, particularly in the Piedmont."

The value of having a multi-layered program of breeding bird research lies in the whole created by the sum of the parts. Each of these programs is designed to produce specific and distinctive data. The Atlas provides specific information on geographic distribution of birds; the BBS provides population indexes and trends; the Breeding Bird Census provides density data. "Together, these programs complete a picture that would be impossible for any of them to do on their own," says Wiley.



LEONARD LEE RUE III

***Bird-call counts aid*** *Wildlife Commission biologists in setting season limits on game species like the mourning dove and the bobwhite quail. Information from these counts confirms reports that quail populations have fallen in recent years.*

From where LeGrand stands in the dark, however, the big picture can seem a bit fuzzy. He's been up since 4:30 in the morning, and after the route is over, LeGrand still has to put in a full day at work. Still, he realizes that the numbers he is amassing are an integral part of a database he himself relies on. And by the end of this one route, LeGrand will have identified 782 individual birds of 63 species, including 36 indigo buntings, 48 common grackles, nine cedar waxwings, eight summer tanagers and a single Kentucky warbler.

Still, it can get lonely out on the road. "You'd think that at some point I'd just fall asleep and run off the road, but I haven't," he says. "Although about halfway through I'll start muttering to myself." Which is fine, as long as he mutters quietly. There are no BBS provisions for noise interference due to babbling in the dark. ☒

BILL PALMER

# Are Pesticides Harming Quail?

## At long last, biologists are beginning to learn more about the relationship between bobwhite populations and pesticide use on modern farms.

written by Vic Venters
photographed by Melissa McGaw

In the rolling grain fields of East Anglia and Hampshire, British researchers have spent the last 30 years studying the declining fortunes of the gray partridge, a popular gallinaceous gamebird whose populations have decreased severely in England during that time. While England's manicured landscape is not exactly analogous with North Carolina's rough-and-tumble croplands, British biologists have discovered some factors involving pesticides and wildlife that may go a long way toward explaining bobwhite quail declines in the South.

Like their American counterparts, British farmers have increasingly become reliant on pesticide use—both insecticides and herbicides—in the years since World War II. As British farms have become cleaner, gallinaceous birds like ring-necked pheasant, red-legged partridge and gray partridge have declined as weedy patches and native flowering plants disappeared.

The three-decade study has proved that a major cause of the gamebird declines on English farms can be linked to a corresponding

***Researchers monitor** a pesticide spraying to test the effects of foliar soybean insecticides on quail chicks. So far, biologists have discovered no direct effects on bobwhites caused by this type of insecticide exposure.*

***North Carolina State University** researchers Marc Puckett (left) and Bill Palmer (right) trap and radio-collar wild quail at the Alligator River National Wildlife Refuge. Much of the work has been devoted to learning how quail reproduce in and use areas that have or don't have suitable native habitat.*

decline in the availability of insects as a food source for young hatchling gamebirds. During their first few weeks of life, all gallinaceous gamebirds—bobwhite quail included—are extremely dependent on an insect diet to supply protein and oils for growth. Where there are not enough insects, hatchling bird survival is poor and populations, consequently, have declined. With the British partridge, it is not so much that pesticides have directly poisoned or killed birds, rather a case of the agrochemicals indirectly harming populations by removing needed brood habitat, insects and foraging areas for the hatchling birds.

The good news is that British researchers have been able to increase partridge populations dramatically by leaving unsprayed field borders where native plants—and insects—can flourish. The untreated areas have abundant insect populations during the critical growing stage for young partridges, and populations have rebounded dramatically on farms where borders are left along fields.

You may well wonder how any of this applies to America. Quail biologists have long suspected that modern agricultural practices—clean farming, mechanization, loss of crop diversity and heavy use of pesticides—have been a leading cause of bobwhite declines. What they haven't understood is precisely how these factors were interacting to contribute to the declines.

It's often been noted that the bobwhite quail is the most studied gamebird in North America, having been the subject of literally thousands of research projects. However, many of those studies were performed prior to 1970, at a time when bobwhite habitat was still plentiful and populations relatively stable.

Because of large-scale habitat fragmentation and diminution in the past three decades, however, quail biologists have in recent years begun re-examining many of the old truisms of bobwhite biology learned in earlier, better days. Using modern technology like radio-telemetry tracking equipment, today's biologists can monitor quail far more closely than they could in the past, allowing many new insights into possible factors behind population declines.

For example, late winter mortality from predation and late-season hunting is now being closely examined as one possible factor in bobwhite declines in some areas. Researchers in Alabama and Florida are also currently studying the possible effects of releasing pen-raised quail into wild quail populations.

Studies examining the impact of pesticides on upland gamebirds are nothing new, particularly the impacts of older "hot" pesticides like Parathion. However, many of these studies are now considered out-of-date, and for several reasons. Today's pesticides are generally much less toxic than those of the past, and are usually applied at lower rates. Most of these newer pesticides show little or no direct impact on birds like adult quail. And few of the older studies replicate actual field conditions that quail would likely encounter.

What was also generally neglected in older pesticide studies in America were examinations of the indirect effects of pesticide use on wildlife—how reduced insect populations affect the successful reproduction of quail, for example. Other pesticide studies have mostly focused almost exclusively on dosed quail survival under laboratory conditions, while overlooking bobwhite reproductive ecology in the field. Because bobwhite quail are such short-lived birds, dependent on successful annual reproduction for maintaining stable populations, this omission has been a critical shortcoming in understanding quail declines on farms in the Southeast.

Enter North Carolina State University researchers Pete Bromley, professor of Zoology, and John Anderson, professor of Crop Science, and graduate students Bill Palmer and Marc Puckett. Modeling their study on the research goals of the British partridge biologists, they are now into the third year of a five-year farming and quail study at the Alligator River National Wildlife Refuge in Dare County and on private farms in the Coastal Plain. To date, it is the most comprehensive study of the relationship between pesticides, modern farming techniques and quail population declines ever conducted in the nation.

## Wildlife Pesticide Fact Sheets Available

The N.C. Cooperative Extension Service has produced eight fact sheets that give specific recommendations on pesticide use for major crops grown in North Carolina. A cooperative effort between agriculture and wildlife professionals, the fact sheets illustrate how pesticides can be used carefully to benefit wildlife.

The following subjects are available:
Soybeans, AG-463-1
Corn, AG-463-2
Tobacco, AG-463-3
Cotton, AG-463-4
Peanuts, AG-463-5
Small Grains, AG-463-6
Fruit Trees, AG-463-7
Christmas Trees, AG-463-8

These fact sheets are available from county Cooperative Extension centers and from Agricultural Communications, Box 7603, N.C. State University, Raleigh, N.C. 27695-7603.

***A quail chick feeds*** *on a caterpillar in a cotton field. The relationship between insect abundance and quail population levels is poorly understood, although project biologists are working hard to unravel the clues.*

At the refuge, the researchers have fitted about 100 wild bobwhites with radio transmitters and tracked them on about 3,000 acres of farmland. They've also been using captive quail chicks to estimate direct and indirect pesticide impacts on hatchling quail, their habitat, food resources and survival.

The overall goal of the project has been to compare and contrast quail populations in areas where conventional agricultural techniques are used with those areas where "sustainable" farming methods were employed. Sustainable farming methods stress soil and water conservation, as well as reduced use of agricultural chemicals. The reason for this comparison is potentially important because of a number of social, environmental and economic trends that portend the wider use of sustainable farming techniques in the future. "One of our goals with this project is to design sustainable farming techniques that are both profitable and beneficial to wildlife," explains Palmer. "We believe this is where the potential salvation of bobwhite quail populations may lie."

To achieve this goal, the researchers chose two large farm areas within the Alligator River National Wildlife Refuge. Each large area was subdivided into two smaller areas, to make four study areas, two of which were farmed with conventional modern agricultural methods and the other farmed by sustainable methods, which include field borders and filter strips.

The researchers are monitoring the areas to determine the behavior of quail on farmland during the growing season, comparing and contrasting bobwhite ecology on areas with habitat and areas without habitat. The purpose is to determine where pesticide exposure is most likely and to understand what benefits quail get from conventionally farmed crop fields and those farmed by sustainable methods.

The use of filter strips and field borders are an integral part of sustainable agricultural techniques. For instance, in addition to providing wildlife cover, field borders and filter strips protect water quality by filtering out sediments, nutrients and chemicals from agricultural runoff. They also conserve topsoil by reducing wind and water erosion.

Bromley and Anderson have assembled an impressive coalition of agricultural experts and wildlife biologists. "This project has involved unprecedented cooperation between farmers, N.C. State University agronomists, state and federal soil and water conservationists, wildlife biologists, pesticide experts, farm economists, the U.S. Fish and Wildlife Service, the N.C. Wildlife Resources Commission, Quail Unlimited and the Z. Smith Reynolds Foundation," Palmer said. "I believe some of the lessons we eventually learn can become reality on farms in the Southeast because of the cooperative nature of this project."

By next year—the end of the last season of field work—the researchers will have learned how breeding quail populations use untreated field border areas and filter strips on large, inten-

***Marc Puckett monitors** wild quail in a filter strip in a fallow area on the Alligator River National Wildlife Refuge during late winter. The project's researchers are discovering that the presence of filter strips during breeding season has dramatically increased quail populations in test areas.*

sively farmed lands. They will also have measured and analyzed some of the direct and indirect effects that many widely used insecticides and herbicides have on adult and hatchling quail populations during the breeding season.

While all the data has yet to be collected, some important trends are already emerging. Like British biologists, Palmer and Puckett are finding that fields left with filter strips and field borders produce many more quail per acre than fields with no filter strips. On the Alligator River farms, the researchers discovered that quail were about six times more numerous on filter strip areas than on the clear-farmed areas.

Much of the quail increase in 1993 can be attributed to the improved breeding, brood and bugging areas that filter strips provide during a critical period just following spring planting. "This is the time when hens are searching for nest sites," said Palmer. "Most farms are barren of quail habitat at this time."

Palmer and Puckett's radio telemetry work is also showing that a substantial number of quail use crop fields, in particular soybean fields, for nesting sites, brood habitat and as general habitat throughout the breeding season, a fact that illustrates the great potential of some crop fields as brood habitat and for possible pesticide exposure. "We've observed quail broods out in soybean fields at a time of year when people are applying insecticides," Puckett said. "We're still testing both the direct and indirect effects that this type of exposure may have."

Analysis of data collected so far indicates that the direct and indirect effects of pesticides on quail will vary depending on the type of habitat a farm has. Nest sites in non-crop land would rarely receive direct exposure to a pesticide. Insects, as mentioned before, will also be much more plentiful in weedy areas, providing a better food source for chicks.

By examining both intensively farmed and sustainably farmed fields that have had insecticides and herbicide applications, researchers can compare and contrast food supply and habitat availability. A novel monitoring approach initiated by Bill Palmer has been the use of human imprinted chicks to replicate the field conditions that a wild brood of quail hatchlings might encounter in a field with a recent pesticide application. Imprinted chicks believe humans are parents and will follow them readily. The imprinted chicks trail Palmer into feeding areas as though he was a hen, thereby allowing researchers to closely monitor the chicks' feeding patterns and the effects of subsequent exposure.

The pesticides being tested can be broken down into two major categories: foliar insecticides that are sprayed directly on crops or plants, and granular pesticides that are broadcast or planted onto fields. "Most of the work thus far has dealt with testing the effects of foliar insecticides applied to cotton and soybeans," said Palmer.

Over the last two years, Palmer tested six commonly used foliar insecticides for their direct effects on quail. On this front, the news so far looks good—foliar sprays showed no direct influence on quail. With certain granular insecticides, however, it is another story. Highly toxic agrochemicals are often formulated as granulars because they are generally safer for humans to handle in that form than they would be as liquid, which can be more easily spilled on a handler's clothing or skin.

A potential problem with some granular formulations is that birds may gobble them up after they have been applied to crop fields because they often resemble tiny seeds or grit. Wildlife mortality has been documented in several studies with certain granular pesticides like Furadan. Researchers plan to begin large-scale testing of the direct effects of

granulars on quail this spring and summer.

The indirect effects of pesticides on quail are harder to quantify in scientific terms but the use of imprinted chicks and the project's design is allowing researchers to closely replicate the field conditions that wild quail might encounter.

Palmer has observed quail chicks feeding at their fastest rates following an insecticide spray. "As soon as the chicks see a dead or struggling insect, they eat it and develop a search pattern for similar objects," he explained. "They just fill up again and again. The insects can take several days to disappear in dry weather.

"While direct insecticide effects do not appear to be a concern based on testing so far," Palmer said, "what happens to the chicks when all those insects in a sprayed field are gone? That's a question that remains to be answered.

"If insects aren't abundant enough in fields," Palmer continued, "then brood habitat may be limiting quail populations on a lot of Coastal Plain farms."

There remain many project-specific questions to answer but perhaps the biggest—and most difficult—question remaining is whether or not researchers can devise farming practices that will be profitable to farmers and still be biologically sound for farm wildlife. After 60 years of preaching the need for good habitat, wildlife biologists alone have been unable to find the right combination of farming techniques that are economically viable and good for wildlife. The result has been the still-continuing decline of small-game species.

## Project Funds

A large-scale research project like the one being conducted at Alligator River National Wildlife Refuge is time, labor and money intensive.

The project was only made possible through the cooperation of many private and public agencies and organizations. Financial contributors include the N.C. Wildlife Resources Commission, the U.S. Department of Agriculture in cooperation with the Environment Program, the Z. Smith Reynolds Foundation, the U.S. Fish and Wildlife Service and Quail Unlimited.

The North Carolina chapter of Quail Unlimited contributed over $10,000 to the project. "The support we've gotten from local and state QU chapters has been tremendous," said Bill Palmer, a biologist with the project. "We greatly appreciate their financial and personal sacrifices made to support our work."

***A hen bobwhite rests** with her chicks in grassy brood cover. The researchers are now trying to determine whether a shortage of native brood cover and insects for growing chicks is limiting quail populations in modern agricultural settings.*

"Railing against all pesticide use is not the answer," Palmer said. "Pesticides are a fact of modern agriculture. But the adoption of sustainable agriculture, with its emphasis upon reduced pesticide usage and ecological soundness, may offer a chance to reverse the current quail dilemma.

"Make no mistake, changes are coming to modern agriculture in the next decade," Palmer added. "Take the use of filter strips and field borders. There is tremendous concern from many quarters about sedimentation and nutrient runoff into waterways and aquatic ecosystems. There's also concern about soil erosion. The use of filter strips can help to solve both. Either through regulation or incentives, field borders and filter strips appear destined to eventually become more common on farms. Hopefully, society will understand the importance of these habitat types and financially support farmers for their efforts."

Unfortunately, many field borders or filter strips already required in use are planted in fescue, a non-native cool-season grass with virtually no wildlife benefits for food or cover. "What we need to do is design an 'improved' filter strip that will offer far better benefits for small game and other wildlife than fescue."

Up to now, farmers have been encouraged to plant fescue or mow clean ditch banks and field borders to prevent trees from overgrowing the areas, thereby nulifying any wildlife benefits. However, Anderson and his colleagues are now testing a promising habitat management tool—the pesticide wick—that may be used to kill sapling trees but leave behind insect-rich native grasses and brush. The wick is essentially a horizontal bar pulled to the side of a tractor that can be adjusted for height and angle to apply herbicides only to vegetation that grows high enough to touch the bar. By this method, a farmer could adjust the wick to leave all grassy vegetation below 2 feet in height while young trees growing above the 2-foot mark would be killed by direct, rather than sprayed, herbicide application.

The pesticide wick is already in use in citrus groves in Florida, and it is apparently more economical than mowing. "Given the importance that filter strips may have in restoring quail populations, the pesticide wick could be a tremendous boon if we can fine tune its uses," Palmer said. "All of our work dovetails back to finding a way for farmers to economically create high-quality habitat."

Recent biological research indicates that there may be many factors involved in bobwhite quail declines in the Southeast—predation, late-season hunting, fire suppression in pine forests, and pesticides—the list is long. What these seemingly disparate factors all share in common is a link with the region's degraded and fragmented habitat, which in large part is the result of modern agricultural and silvicultural practices and development. The adoption of economically feasible sus tainable agriculture may not be the total solution to our bobwhite dilemma, but surely it could pull us out of the ditch and back on the road to recovery.

# SODA CRACKERS OR SLABS?

Given half a chance, crappies will eat and reproduce themselves into an overpopulated, cracker-sized bunch of runts, but biologists know how to apply the right prescription to grow those slab-sided fish you prefer.

by Scott Van Horn

I had skipped breakfast and been in the car nearly two hours when the familiar bait and tackle shop sign appeared on the roadside. A diet soda and a honey bun at mid-morning is a personal bad habit I can't seem to shake and I knew my legs would appreciate a stretch. The shop is one of those places frequented by regulars between fishing trips, and I enjoy stopping there when I can. The proprietor is an avid angler with a particular fervor for crappie fishing. I work for the N.C. Wildlife Resources Commission and his eyes light up when I walk in because he knows he has another chance to "educate the biologist."

His usual pattern is to ask a few polite questions while I'm fumbling with my wallet. We both know just as soon as I stick a honey bun in my mouth I'll get a good-natured lecture on how fish management ought to be done in North Carolina. The subject that morning was crappie fishing on B. Everett Jordan Lake in Chatham County.

"Anyone can buy some minnows, sit under those bridges at night and catch a cooler full of nice crappies," he said. "Some nights there're so many boats you have to worry about getting there early to get the better places to fish."

I agreed that the crappie fishing in Jordan had been good lately, and the lake was very popular with anglers.

"Me and my friends don't want the little ones, but some people keep everything they catch," he continued. "I'm telling you there's too many fish being killed and you need to do something about it. Now I know you have that 20-fish creel limit down on Badin Lake and the fish have to be 8-inches long. That's what we need at Jordan Lake. We fish there a lot and if you don't do something soon it'll be ruined."

I was at a disadvantage in that debate. My mouth was full of sticky bun and I needed to be at a work site before noon. I offered the short version of why the Wildlife Commission has crappie limits on some lakes and not others. The store owner was a hard sell and my attempt was clumsy. He wasn't convinced by the time I had to leave.

My debate partner that day is just one of many people interested in crappies. Angler surveys done by the Commission tell us that the crappie is second on the list of freshwater fish people most want to catch. It's easy to get concerned when you see lots of crappies leaving your favorite fishing lake in a cooler. However, this fish's reproductive capability is legendary. The harvest you are witnessing may indeed be very large, but it is more likely the very thing that keeps your crappie fishing enjoyable.

Biologists and a good many anglers have long known the biggest threat to good crappie fishing is too many crappie. When there are more crappie than the lake can properly feed, the fish get thin and quit growing. Crappie harvest drops off as anglers decide the fish are too small to keep and toss them back. The presence of small, but older crappies is a common indicator of stunting. Throwing back a little one doesn't give the fish a chance to grow up, it only ensures that

***Crappies are on many** fishermen's "wanted" list, ranking second in popularity only to largemouth bass in North Carolina. These schooling fish can quickly overpopulate even large lakes, however, and it takes careful monitoring and the right regulations to keep crappies from becoming stunted.*

KEN TAYLOR

***By sampling the crappie*** *populations in Jordan Lake and other lakes regularly, biologists can determine the best regulations for that particular lake. Creel or size limits that work well for a few lakes would be disastrous on Jordan and, indeed, most lakes.*

stunting will persist. We've shunned size and creel limits through the years to encourage crappie harvest and prevent overcrowding. In most cases, it's a choice between having fewer and larger fish, or lots of little ones.

That's still true on most lakes, but during the last decade, biologists in Missouri discovered that something different was happening on a few lakes. Anglers were catching fish so fast on some lakes that few crappie were surviving long enough to get very big. Growth was excellent and the fish were fat because there was little competition for food. Biologists recommended using size and creel limits to give crappie another year of life. They reasoned anglers could still catch most of the crappie a year later, but the fish would be a lot bigger. It worked! The pounds of fish going home in coolers actually went up under the new regulations. Missouri didn't adopt the regulation statewide because they knew it was appropriate for only some of their lakes.

These differences among crappie populations are important to crappie managers. Most crappie populations are somewhere between badly stunted and heavily overfished. Missouri has shown that size and creel limits can help where harvest of young crappies is excessive. However, the same regulations will push crappie toward stunting for most other populations. Good decisions about crappie regulations require good, current information about crappie populations.

Each fall on your favorite reservoir, you may see Wildlife Commission biologists fishing trap nets for crappie. They determine crappie abundance, growth rates, weight and age from the fish they collect. This work provides the underpinning for the Commission's decisions on crappie regulations.

My shop owner wanted to know why crappie regulations on Badin Lake wouldn't help crappie in Jordan Lake. Here's why. We caught almost six times as many catchable size crappies in each net at Jordan as we caught at Badin in a recent four-year study. Black crappie in Jordan were about 8 inches long toward the end of their third growing season. At Badin, fish the same age were 11 inches long. Badin's crappies were also heavier than their Jordan Lake counterparts. Finally, Jordan Lake had four times as many crappies 3 years old and older as Badin Lake. One autumn, all of the crappies we caught at Badin Lake were 1 year olds!

We believe anglers are catching and removing most crappie from Badin Lake before the fish are 3 years old and we expect the size and creel regulations will delay harvest and improve

JIM DEAN

***Bluntly stated,*** *crappies don't belong in ponds because they invariably overpopulate and become stunted, ruining the fishing for other species as well. Scott Van Horn (left) and Cliff Edwards were dismayed to find that someone had secretly stocked these crappies in their favorite bluegill and shellcracker pond.*

crappie fishing. Similar regulations on Jordan Lake would more likely create stunting and hurt a very good crappie fishery. For those lakes where crappie are already overpopulated, the Badin size and creel regulations would certainly be the wrong choice.

There is another mistake many anglers make concerning crappies, but fortunately it can be avoided. Simply stated, crappies don't belong in farm ponds. Crappies are fish eaters with a taste for shad, especially threadfin shad. Threadfin thrive in the large open areas of our reservoirs and can really help keep crappies fat and growing rapidly. Open water habitat teeming with shad just isn't present in ponds. If crappies are stocked into a pond, they almost invariably outrun their food supply and become stunted.

I had the opportunity to fish some private ponds in Franklin County this past fall. The invitation came from a friend whose careful pond management was producing eye-popping catches of bluegills and shellcrackers—some that exceeded 3 pounds—and some nice largemouth bass. You can imagine my excitement at getting to see this extraordinary fishery. The morning of the big day, I was rigging up and my host shared some chartreuse and black tube jigs tipped with curly tailed grubs that he recommended as "cracker" lures.

We caught a few bream weighing nearly a pound that day, but we caught close to a hundred black crappies. Had we been fishing a local reservoir, we would have been delighted with the fast action on pan-sized crappies. Disappointment, however, was the primary emotion evident on my host's face. We both feared that all of the effort to create something special had been ruined by the introduction of crappies by a thoughtless guest. We knew the presence of crappies would change the bass-bream balance in the pond.

Well-intentioned anglers have ruined many high-quality fish ponds by stocking crappies. What works in reservoirs may not work in ponds. Would-be fish managers unknowingly lay the seeds for disaster when they release crappies into their favorite pond. Typically, a few fish will show up in the first year. Those first crappies may even grow rapidly and be fun to catch. Sooner or later, bream and largemouth become smaller, thinner and less numerous.

Eventually, stunted crappie take over the pond. Few fish will exceed 8 inches, and it might be possible to read a newspaper through the bodies of the thinner ones! Stocking shad in the pond to improve crappie growth will only make matters worse as even more of the desirable game fish are replaced. Usually, the pond must be reclaimed to remove the crappies, and it will take several years to restore the fishery to its original condition.

I'd call it vandalism and destruction of private property if you are stocking crappies in the ponds of others without their permission. I know a pond owner in Franklin County who agrees with me.

I'm sure I'll get a chance to visit that bait and tackle shop again. I value the education my friend gives me, and I hope I occasionally return the favor. Perhaps next time I can convince him that a crappie regulation that gets good results at one body of water may be a recipe for disaster at another.

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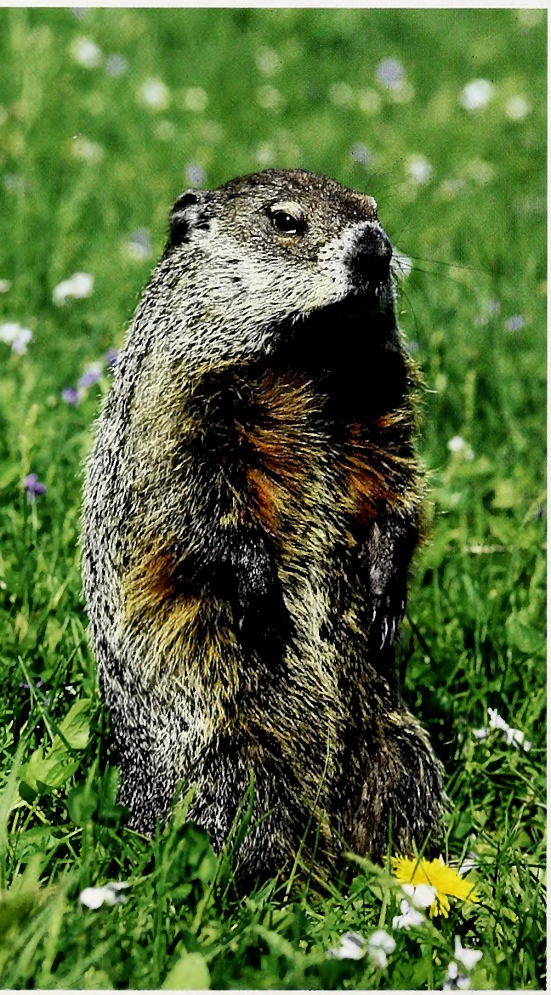
*Scott Van Horn is a biologist with the N.C. Wildlife Resources Commission's Division of Boating and Inland Fisheries.*

# Regarding Groundhogs

You may be sick of prognosticating whistle-pigs from Punxsutawney every February, but these big ground-dwelling squirrels—and their shadows—are here to stay.

written by David S. Lee © 1994
photographed by Len Rue, Jr. © 1994



Groundhogs are so efficient they are overendowed with idle time. For example, a groundhog can be sunning, digesting food and having innovative thoughts about new burrow designs all simultaneously. Grooming and an occasional well-deserved yawn are often the only interruptions. And all this activity is broken by three or four months of winter sleep.

Groundhogs are really just big ground-dwelling squirrels that weigh up to 12 pounds. Along with beavers and porcupines, they are among the largest rodents native to North America and are a common sight sitting erect in mountain meadows. They devote hours to surveying their surroundings looking for rivals and assessing potential dangers while digesting the morning's forage and packing away fat for the winter.

Even though you would not guess it from watching them, groundhogs and other species of marmots have proven intriguing subjects of study. Groundhogs, also called woodchucks in some areas of the Eastern United States, were the subjects of several intensive studies in the 1950s and 1960s, prompted by complaints of crop damage. Actual crop damage problems caused by burrowing and foraging activities are usually localized or are often the work of only one or two individuals. Nevertheless, in regions where there are mowed crops (oats and wheat for example) damage can be extensive. Individual groundhogs not only consume large amounts of these crops—over a pound per day—but while making trails they trample extensive areas that cannot be harvested. Also, they occasionally raid home gardens and can destroy even a modest-sized one in hours. In some areas they even damage fruit trees. I once saw one high in a tree eating apples.

Groundhog burrows are often a bigger problem, sometimes causing breaks in earthen dams, canal banks and irrigation ditches. Their soil mounds can damage the cutting blades of mowers, making it necessary for high-level cutting and a consequent loss of a variety of crops. The burrow openings are a potential hazard to domestic animals, but accusations of leg breakage by stock could be overstated. Additionally, groundhogs and the related marmots of Western states may be reservoirs for some diseases such as tularemia and sylvatic plague, and can harbor ticks that are vectors of spotted fever.

From the turn of the century through the 1950s, the U.S. Department of Agriculture led a well-meaning educational campaign that divided the animal kingdom into the arbitrary categories of "harmful" and "beneficial" wildlife. About the only way to be in the latter group was to regularly eat something in the former group, preferably in large quantities. Animals with economic merit—you could eat them or sell their pelts—could also be classified as beneficial.

For reasons that are unclear, groundhogs are seldom used as food in North America; however, evidence from middens indicates that they were eaten by native Americans. The fur of groundhogs is of poor quality, and the large fat reserves make the meat and pelts quite greasy. Consequently groundhogs have, by default, been labeled as bad guys and have served as targets for "varmint" shooters.

In the past, bounties were thought to be a successful, but temporary, way to control local groundhog populations. A study in Pennsylvania examined the actual effect of groundhog control. During a four-year program, 1,040 groundhogs were removed from 600 acres of farmland. This resulted in a decrease in emigration, and a simultaneous increase in the birth rate as well as a higher survival rate in the young. The population level in the harvested 600 acres and a similar-sized control area where no hunting was allowed was indistinguishable at the end of the four-year study.

Groundhog appreciation, however, is possible from their ecological importance in the scheme of things. For example, the value of

***Groundhogs aren't confined*** *only to the ground as the photo at right attests. Since the middle part of this century, groundhogs have also been expanding their range in the Southeast, probably because of human alteration to the landscape.*

***Groundhogs,*** *which are prolific breeders, have traditionally been viewed as either "varmints" or as a furry barometer of upcoming spring weather.*

groundhog burrows for rabbits and other wildlife seeking refuge has been mentioned by many authors. It is clear that groundhog burrows provide shelters for many species that otherwise would lack adequate natural den sites. Results of one study were remarkable. Traps were set in the entrances of 94 woodchuck burrows in Indiana. In addition to capturing 35 woodchucks, the traps yielded 20 opossums, 19 cottontails, 104 white-footed mice, two meadow voles, 32 house mice, two meadow jumping mice, eight raccoons, one red fox and one gray fox. I recall from early spring walks that the abandoned burrows also provide hibernation sites for a number of species of snakes.

These rodents can also be appreciated as masterful engineers. The den of a groundhog is easy to recognize. It will have one to five entrances and is nearly always in an open area on well-drained soil. The den design varies considerably. Dens may be simple, short burrows terminating in a nest chamber, or complex ones with a number of entrances, a maze of burrows, blind chambers and multiple nest chambers. A large mound of fresh dirt marks the main entrance and there may be numerous trails radiating out, going both to and from feeding areas.

If in doubt, look about for the groundhog itself sitting on its dirt porch. Entrances are often plugged from within, perhaps to control the neighborhood squatters who are too lazy to dig their own burrows. Some, like skunks, would at best seem unwelcome, and foxes even more so. Foxes, both species, often appropriate groundhog dens, and sometimes the resident groundhog as well. Dens occupied by foxes do not have mounds of fresh soil at the entrance and various animal remains may be found around the den openings.

The groundhogs clean out their burrows several times a week, so an occupied residence is apparent to anyone interested in such things. The basic burrow has a main entrance that descends downward from the dirt porch at a moderate angle, and one or more plugged holes that drop abruptly downward. These holes are excavated from within by burrowing up from one of the main galleries, thus leaving little soil on the outside. The plugged burrows are much smaller than the main entrance and are primarily used as escape routes.

There are actually two types of dens, one for summer and another for winter. The winter dens are used only during hibernation, and are normally in wooded areas on sloping ground. Winter flooding is a real problem for these rodents if no high ground for a den site is available. The winter dens have only one opening, and even if the animals can escape during a flood, they usually die of exposure.

Years ago, I had the notion that I was going to dig out the den of a groundhog, make three-dimensional maps of its design—for what purpose I can no longer recall—and have my very own litter of groundhogletts. The latter goal, in hindsight, seems even more ridiculous than having a blueprint of a residence.

For several weekends I dug and moved rocks, with the counter-activities of the occupant equalling mine. The outcome of all this rodent and human activity was a large number of mounds of exposed dirt of various sizes, an incomplete map of groundhog excavations and repairs, and one really mad male groundhog.

I have since learned that groundhogs are solitary—information that was available in a number of books that I had not bothered to read. It was also informative to see that a farmer and a tractor—actually the amused father of a high school friend—could repair all the damage the groundhog and I had done in less than an hour. There were probably a number of lessons in this groundhog caper and I like to think that I learned most of them. At least I was never inspired to try to map out another burrow system.

The most complex dens are evidently made by older animals and are perhaps enlarged or modified by several succeeding generations of animals. At the bottom of the main entrance there is usually a turn-around chamber, but from there the dens assume a variety of diverse forms. The nest chamber, which I don't think I ever found, is usually constructed on a higher plane than the deepest part of the system and contains dried and shredded leaf material. Dens, so books tell me, are seldom more than 5 feet deep. Whoever measured dens probably had enough forethought not to dig one up that was built into the side of a hill.

South of Pennsylvania and New Jersey, groundhogs were once mostly confined to the Piedmont and mountain areas, and from Virginia southward they were restricted to the mountains. In the middle part of this century, however, the species began expanding its range into the Piedmont and Coastal Plain. Today, it is found in the Delmarva

Peninsula southward as far as sandy loam soils occur. This includes most of Virginia and across the northernmost counties of North Carolina east to the Roanoke River as well as throughout most of the Piedmont. The clearing of forest for agricultural purposes has obviously increased the amount of available habitat for this species. However, the recent expansion probably is a result of highway and utility rights-of-way and river levies providing paths of dispersal from adjacent upland areas. The development of the interstate system appears to have provided continuous belts of relatively predator-free habitats and dispersal corridors.

Probably the most wonderful thing about groundhogs—something that might get them out of the harmful varmint category—is their annual ability to provide the news media with totally meaningless copy to be reread year after year. About five years back I was so motivated by my memory of the printed nonsense of the previous year that I called the local newspaper a full six days before Groundhog Day and announced that I wanted a reporter to come by the N.C. Museum of Natural History where I work to write an interesting story about Groundhog Day. This would be one year, I reasoned, that perhaps we could get some factual information into the paper in place of the rehashed story about a bunch of grown men who dig up some poor sleeping woodchuck in a Pennsylvania town with an unpronounceable name.

I spent half-a-day looking up groundhog facts and 20 minutes or so at the photocopier. Come the morning addition and the populace would learn the fascinating story of groundhogs. Now I realize that editors don't send their ace reporters to do stories of this type, nevertheless my disappointment cannot be put into words. There on the front page was a photograph of me holding a mounted groundhog that had a Cheshire cat smile that had been taxidermically embroidered on its face in the mid-1930s. The story was about Punxsutawney Phil, who once again was rudely awakened by the media to prophesize the eventual coming of spring.

Groundhog Day is not really about rodents anyway. It is actually an American variation of the tradition—long widespread in the European Christian world—that a sunny Candlemas, a festival honoring Mary and the infant Jesus, promised a cold spring. The Scottish version being "If Candlemas is far clear there'll be two winters in the year." Somehow a long forgotten publicity agent for *Marmota monax* turned this religious commemoration into six more weeks of winter if the burrowing, fat varmint could see its shadow. This seems to be the origin of the woodchuck's fame.

Starting sometime on the first morning of February, the entire civilized world makes it a point to ensure that no newsworthy events leak out for the next 24 hours. Groundhogs, unlike most mammals that make themselves scarce for the winter, are true hibernators. They have no particular compulsion to awaken on February 2. In general, however, groundhogs hibernate for longer periods in the North and shorter ones in the South. In North Carolina, for example, I have observed active groundhogs every month of the year.

***Abandoned or unused** groundhog burrows provide excellent habitat for a wide range of mammals—such as rabbits, raccoons, mice, foxes and opossums.*

As one would expect, scientific studies do much to muddle myths. While mammals conserve energy more efficiently by hibernating, woodchucks kept at cold temperatures did not become torpid as long as they were fed. Conversely, laboratory animals could be retained in hibernation for up to two-thirds of the year simply by keeping them in refrigerators, while in nature hibernation normally lasts only three or four months. Groundhogs emerge from burrows in Pennsylvania around the time of Groundhog Day. Emergence occurred between January 29 and February 8 during eight years of record-keeping, but the date had no relationship to the local weather. Farther north they come out much later and, in the South, hibernation is little more than a short nap.

Groundhogs lose a lot of weight during hibernation—an average of 33 percent during studies in Maryland. As true hibernators—unlike chipmunks and other native squirrels—groundhogs do not store food and live entirely off their fat reserves. One would think that a one-third loss of weight would rather deplete fat supplies by spring, but I recall a groundhog I found killed along the road in early April. I prepared it as a museum study skin spending a great deal of time scraping fat from the underside of the greasy skin. Indeed, emerging groundhogs may be thinking more about sex than food when they first peer from their burrows. It's a good thing. The bleak January and February landscape cannot have much interest to a rodent.

Certainly, a groundhog has no interest in its shadow. Few of us can recall exactly what it means if a groundhog sees its shadow anyway.

Besides, there's a 50 percent chance of getting it right, and any meteorologist will take those odds. ☐

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*David S. Lee is the curator of birds at the N.C. Museum of Natural Sciences in Raleigh.*

*Will Work for Conservation Coalitions*

## Tom Earnhardt Named N.C. Wildlife Federation Director

*Written and Edited by Vic Venters*

In December, the N.C. Wildlife Federation named Tom Earnhardt of Raleigh as its new executive director.

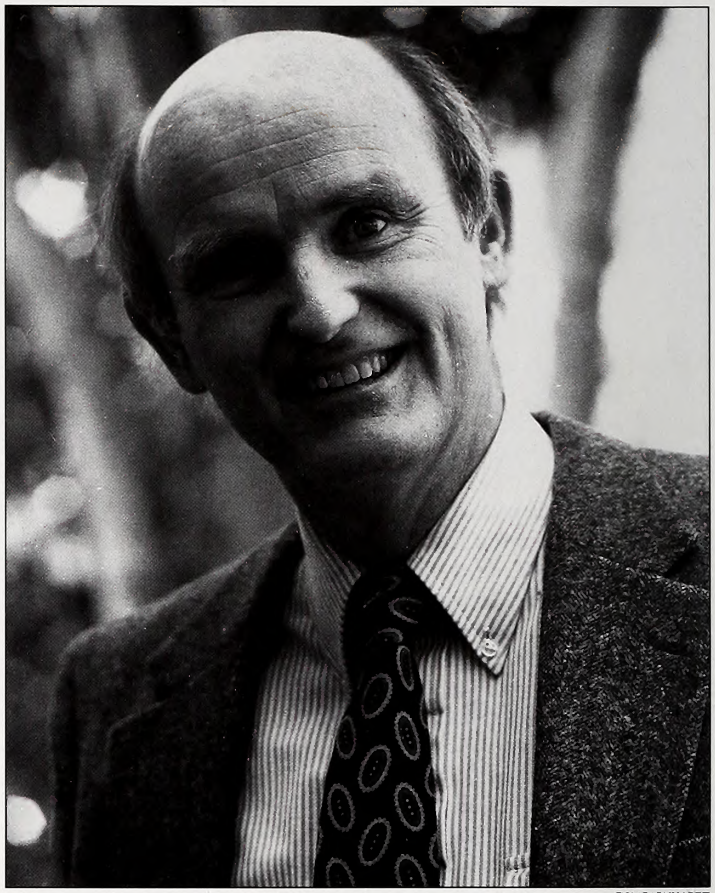
Earnhardt, professor of law on leave of absence from N.C. Central University in Durham, brings to the position an impressive resume of conservation achievements. An avid angler and hunter, he was a national director for Trout Unlimited, has served on the board of directors for The N.C. Nature Conservancy and the Wildlife Federation, and is on the National Fly Casting Advisory Committee of the Federation of Fly Fishers.

In addition to being a noted wildlife photographer, book and video author, Earnhardt has led scientific and conservation-oriented expeditions into China and Siberia, and has developed liaisons with several Russian fishing and conservation clubs. Before becoming a professor of business and environmental law, he served as assistant secretary for the N.C. Department of Administration.

Earnhardt has also worked extensively with seriously ill children at actor Paul Newman's The Hole in the Wall Camp and worked with the Orvis Corporation to create a video for use in children's hospitals. In 1991, he was named the N.C. Wildlife Federation's Conservationist of the Year.

At the Wildlife Resources Commission's December meeting, Earnhardt talked about the need for uniting the conservation community. "I'm concerned about all the labels and name-calling floating around the mainstream conservation community," Earnhardt explained. "We all tend to separate ourselves by labels—as an environmentalist, as a conservationist or as a sportsman—and then fight over what are really very narrow issues. Meanwhile, the larger and most important goal of conserving our natural resources for our children is lost."

"I hope to be able to bridge some these gaps," he added, "and do some fence-mending. Our children's quality of life will depend on access to wild places and that's what I want to work for."



TOM EARNHARDT

***After a nationwide search,*** *Tom Earnhardt has been named the new Executive Director of the North Carolina Wildlife Federation. Earnhardt is a law professor at N.C. Central University and has been active in numerous conservation and charitable organizations.*

*Credit Cards Accepted*

## Geological Survey Section Sells State Topo Maps

Whatever your interest in the outdoors—hunting, fishing, hiking, boating or bird watching—good maps are a necessity, both for success and safety. Finding the maps you need, especially topographic maps, hasn't always been easy, particularly if a local source doesn't carry a selection covering the entire state.

One reliable source of any topographic map for North Carolina is the Geological Survey section of the N.C. Division of Land Resources. The office is now accepting Visa and Mastercard charge cards for mail or fax orders of topo maps.

The Survey Section stocks complete North Carolina coverage of 7.5-minute (1:24,000 scale) at $3 per map; 30-minute (1:100,000 scale) at $4 per map and 2 degree (1:250,000 scale) at $4 per map. In addition to the topo maps, there is also a wide selection of geological publications and maps available.

The Survey Section promises same-day shipping if the order is received early in the day. The 7.5-minute topo maps have proven particularly popular with sportsmen, and the Geological Survey Section carries an inventory of complete state coverage.

All in-state sales are subject to 6 percent sales tax. Call or write for shipping and handling charges.

The section also has a publications list available. To order or for more information, contact the N.C. Geological Survey, P.O. Box 27687, Raleigh, N.C. 27611-7687. Telephone orders or inquires may be phoned to (919) 733-2423. Orders may be faxed to (919) 733-0900.

*Fish and Wildlife Service Offers Reward*

## Two Golden Eagles Stolen From Carolina Raptor Center

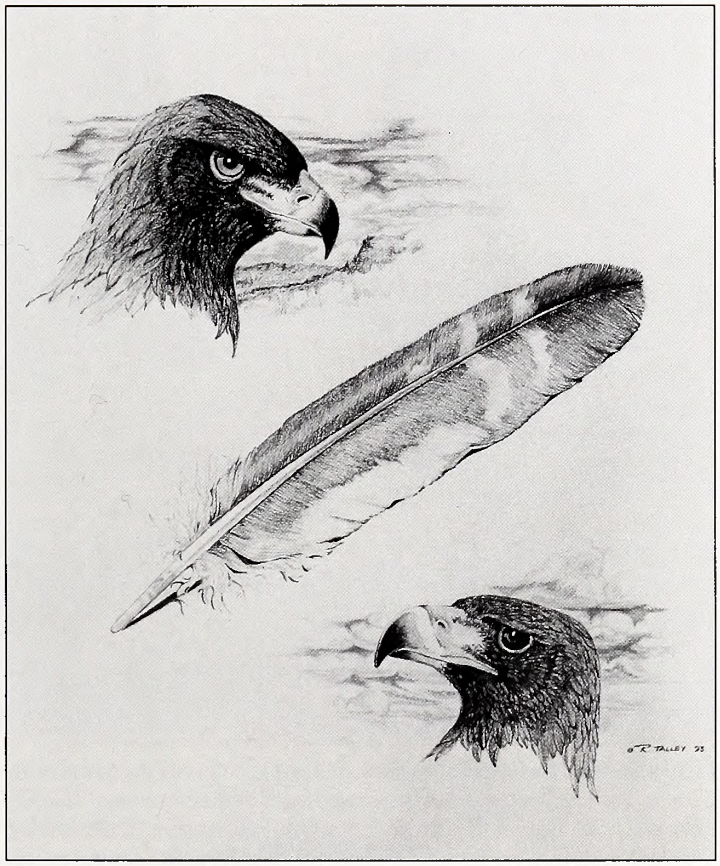
The Carolina Raptor Center in Charlotte lost a couple of its prized possessions last fall when two golden eagles were stolen from their holding pens in late October.

The thieves broke into the locked aviary of the two eagles on the night of Oct. 24. The aviary of a third golden eagle was also tampered with, but the culprits were unable to gain access to the bird in it. The aviaries of other raptors were not touched. It was apparent that the eagles had been specifically targeted.

It is suspected that the pair of eagles, named Betsy and Caesar, may have been abducted for their feathers, which are used in some religious ceremonies. "If these birds were taken for their feathers," said Laura Keistler, the development director for Carolina Raptor Center, "then the people who did this have missed the whole point of why those feathers are considered to have special significance." At presstime for *Wildlife in North Carolina*, the eagles remain missing.

To raise awareness about the troubling incident and funds for the center, North Carolina artist Rodney Talley of Charlotte has produced a limited edition print depicting the two stolen eagles and a golden eagle tail feather. "The artist has donated his time for the painting and is donating 100 percent of the proceeds from the sale of the print back to the raptor center," Keistler said.

"Hopefully the print will turn an otherwise tragic incident into a positive statement and raise consciousness of the work of the Carolina Raptor Center," Talley added. There will be 750 prints for sale. The price is $50 per print, which includes a membership to Carolina Raptor Center. Prices are $30 per print for current raptor center members.



***North Carolina artist** Rodney Talley painted this portrait of Betsy and Caesar, two golden eagles that were recently stolen from Carolina Raptor Center in Charlotte. All of the proceeds from the sale of the print will go to benefit the center.*

The two golden eagles came to the raptor center from the western United States and both were missing one wing. The birds were used in educational exhibits. The Carolina Raptor Center had hoped to use the eagles for captive breeding purposes. The theft of the two eagles is serious enough that the U.S. Fish and Wildlife is offering a reward of up to $2,500 per bird for information leading to the arrest and conviction of those involved in the crime. Penalties for possession of golden eagle feathers or parts includes fines up to $10,000 and two years in prison.

In addition to Fish and Wildlife Service involvement, the FBI, the N.C. Wildlife Resources Commission, the Charlotte Police Department and the Mecklenburg County Parks and Recreation Park Rangers are also involved in the investigation.

The Carolina Raptor Center is a regional facility dedicated to the conservation of birds of prey such as eagles, owls, falcons and hawks. Since 1981 center staff have treated over 4,300 injured raptors and presented over 4,000 programs reaching more than 500,000 people.

If you have information about the missing eagles, or if you want more information on the eagle print or center, contact the Carolina Raptor Center, P.O. Box 16443, Charlotte, N.C. 28297, or call (704) 875-6521.

## Federation Sponsors Student Art Contest

The N.C. Wildlife Federation is sponsoring a new statewide conservation art contest for school students in 3rd through 5th grades. This year's theme is *Wildlife in My Life: Wild Places and Wild Things in North Carolina.*

Students from 3rd, 4th and 5th grades can enter the contest by drawing or painting a picture featuring wild places or animals found in their area of the state.

Winners will be picked on district and state levels. Ninety district winners will receive certificates of merit. Nine state winners will receive plaques. In addition, the state winner for each grade will receive $100 to be used for a conservation project.

The deadline for all entries is March 25. District winners will be announced on April 8. State winners will be announced April 22.

For more information, contact Angela Baker-James, N.C. Wildlife Federation, P.O. Box 10626, Raleigh, N.C. 27605, or call (919) 833-1923.

## Video Offers Management Tips

The end of winter heralds the beginning of small-game management season for farms and agricultural lands across North Carolina. "Protecting Our Wildlife Heritage: Small Game Management" is a 25-minute video produced by the N.C. Wildlife Resources Commission. The video details the various habitat management steps landowners or farmers can take to increase and protect farm wildlife such as quail and rabbits. A farm in each of the state's three major regions is featured. To view the tape, contact your County Extension Agent or a District Wildlife Biologist.

*Boat, Motor, Trailer Awarded*

## State Safe Boating Contest Yields Big Prize

As part of a 1993 Boating Safety Campaign for the N.C. Wildlife Resources Commission, enforcement officers gave each boater that passed a safety inspection an entry form to win a free boat, motor and trailer. More than 9,500 boaters submitted entries last year for the contest, and the lucky winner of the 1993 Boating Safety Campaign was Henry R. Moreno of Raleigh. Mr. Moreno's boat was inspected by Wildlife Officer Wes Barger on Falls Lake in May 1993.

The contest, designed to encourage safe boating and compliance with safety regulations, was a joint effort between the N.C. Wildlife Resources Commission, United States Power Squadrons, the U.S. Coast Guard Auxiliary and several marine manufacturers.

Mr. Moreno accepted the boating package at the Wildlife Commission's meeting in December. The 14-foot boat was donated by McKee Craft; the 50-horsepower Mariner Motor by Mercury Marine; and the trailer by Magic Tilt Trailers.

KEN TAYLOR

***Henry Moreno took home** this boat, motor and trailer as the grand prize in the 1993 N.C. Boating Safety Campaign. The boating package was awarded at the December Wildlife Commission meeting. From left to right are: L. M. Barnes III, United States Power Squadron; Henry Wesley, U.S. Coast Guard Auxiliary; David Roscoe, Magic Tilt Trailers; Henry Moreno, boating safety campaign winner; John F. Lentz, Chairman of the N.C. Wildlife Resources Commission; and Wes Barger, Wildlife Enforcement Officer.*

*Looking for Members*

## Handicapped Sportsmen Group Forms

A new organization has been formed for handicapped sportsmen in North Carolina. The N.C. Handicapped Sportsmen Association was formed in October by J. H. Allen and C. E. Allen of Biscoe.

The goal of the group is to promote information about issues related to handicapped sportsmen and women, including information about those areas most accessible to the disabled.

"The membership is open to all the handicapped men, women and children, and also to people that will help those who need help," explained Joseph Allen, who is currently the president of the fledgling group. "There are about 23,000 holders of the N.C. permanent handicapped hunting and fishing licenses in the state."

"One rule for joining is that members must be safe and courteous and obey all game laws," Allen added. "We will try to publish a quarterly newsletter if people will send us information to use." Annual dues will be $5 for members 16 years and older, and $2 for junior members.

For more information, contact the N.C. Handicapped Sportsmen Association, c/o J. H. Allen, Rt. 1, Box 140-A, Biscoe, N.C. 27209.

## Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before travelling to an event. Items for listing should be conservation-oriented and sent four months in advance.

**Feb. 18-20**

The Twelfth Annual Southeastern Wildlife Exposition will be held in Charleston, S.C. Over 500 exhibitors will feature wildlife art, crafts, conservation exhibits, collectible and sporting antiques. For more information, contact the Southeastern Wildlife Exposition, 211 Meeting Street, Charleston, S.C. 29401, or call 1-800-221-5273.

**March 5**

The Stevens Nature Center at Hemlock Bluffs Nature in Cary is sponsoring a Nature Art Auction to benefit environmental education exhibits. Donations by artists are needed. For more information, contact Stevens Nature Center, Hemlock Bluffs Nature Preserve, 2616 Kildaire Farm Road, Cary, N.C. 27511, or call (919) 387-5980.

*Cash and Plaques for Winning Students*

## Natural Resources Science Fair Awards Available

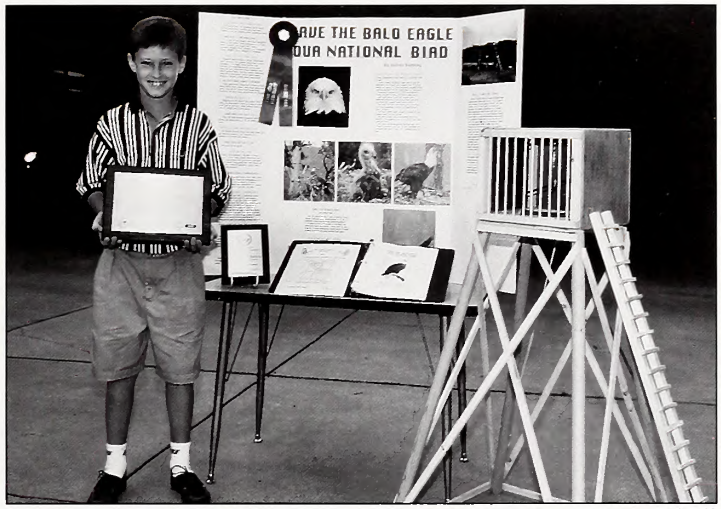
Students and educators should consider submitting projects that deal with wildlife and natural resources when entering the statewide regional science fairs.

Natural Resources Science Fair Awards are presented at each of the state's eight regional science fairs each year. The awards are presented to students whose projects recognize the importance of natural resources conservation by utilizing scientific methods to produce interesting, innovative and educational investigations and experiments.

Entries are judged by professional educators of the N.C. Wildlife Resources Commission and N.C. Wildlife Federation. Projects will be judged at the eight regional science fairs, all held in March. Prizes include monetary awards and plaques.

Their are four categories: Senior Division, grades 9-12; Junior Division, grades 6-8; Elementary Division, grades 3-5; and Merit Awards, grades 3-12. The awards are sponsored by the Wildlife Commission's Division of Conservation Education and the N.C. Wildlife Federation as part of the Commission's North Carolina WILD environmental-education program.

For more information, contact the N.C. Wildlife Resources Commission, Division of Conservation Education, 512 N. Salisbury St, Raleigh, N.C. 27604-1188, or call (919) 733-7123.

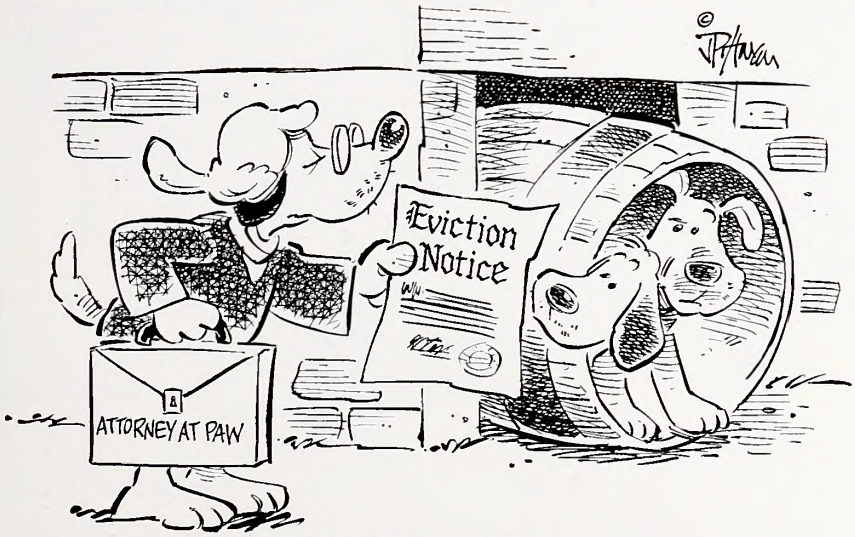



KEN TAYLOR

***Pictured above is** Region 3's 1993 Elementary Award winner Sutton Barbrey of Lynn Road School. His project was "Save The Bald Eagle."*

*What's He Barking at Now?*

## Dog Named "Lawyer" Was Smart




I greatly enjoyed the story "Calling All Dogs" ("Our Natural Heritage," December 1993) I particularly liked the part about the family of dogs and animals that were all named Buck.

Your story reminded me of when I was growing up on a farm in Martin County. When I was hunting back then, right after the Depression, you had to hunt for meat and grow your own food. My dad had three of the best rabbit dogs that ever chased a cottontail.

One dog was named Lawyer and he lived up to his name—he was one smart dog. Lawyer lived to be nearly 14 years old and that was old for a dog. We had a barrel under the house just for Lawyer to sleep in. He eventually got too old to fight when the other dogs went into his barrel to sleep. Instead, Lawyer would go around in front of the house and bark. The other dogs would come running out to see what he was barking at. Lawyer would then slip back and get in his barrel. And that is the honest truth.

My mind often goes back to the fond memories of those bygone days. I still cherish them to this day.

*—Virgil Edmondson*
*Scotland Neck*

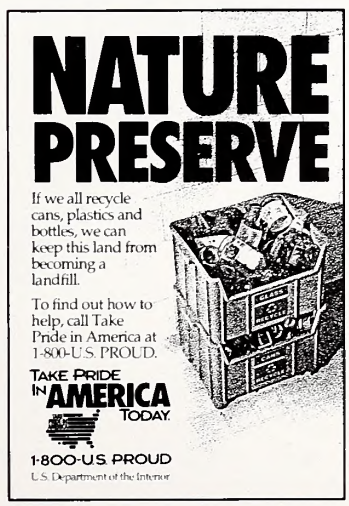
*Corrections*

## For the Record

October 1993 issue: In "The Mighty Oaks" it was Aaron Burr, not Thomas Jefferson, who was tried for treason in 1807.

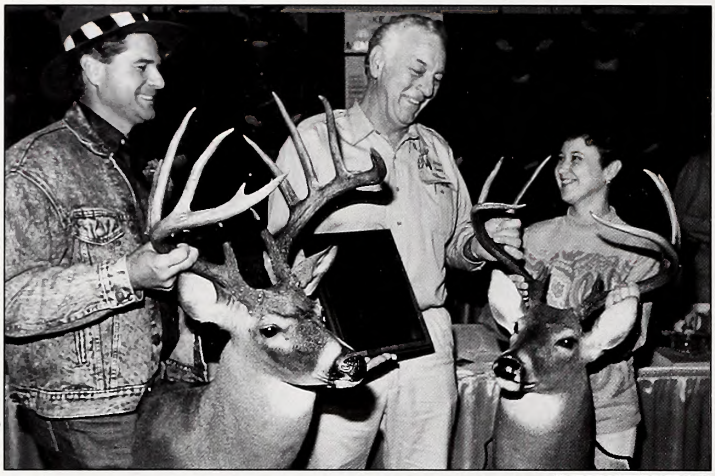
December 1993: On page 14 in "Images of Wildness" Robeson County was misspelled.

December 1993: On page 27 in "From Hatteras to Hiwassee" Wananish is located in Columbus County, not Bladen County.



*March 4-6 in Raleigh*

## Dixie Deer Classic on the Way



WAKE COUNTY WILDLIFE CLUB

***The fourteenth annual** Dixie Deer Classic will be held March 4-6 at the North Carolina State Fairgrounds in Raleigh. The 1994 Classic will feature several deer hunting experts and deer management authorities, including Scott Osborne, the N.C. Wildlife Resources Commission's Big Game Management Coordinator. Bowhunting expert Noel Feather; calling expert David Hale of Knight & Hale Calls; and David Morris, the founder of* North American Whitetail *magazine, are also scheduled for the show. For more information, contact the Dixie Deer Classic, c/o Wake County Wildlife Club, P.O. Box 99048, Raleigh, N.C. 27624, or call (919) 782-5333.*

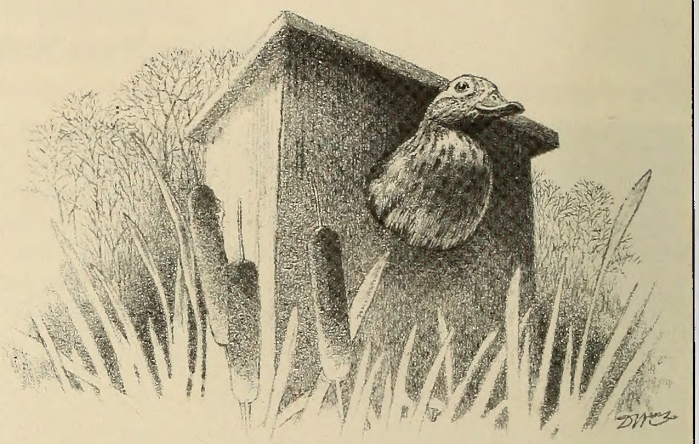
## Wildlife Endowment Fund Report

**November 1993**

Principal Balance
$18,997,735.00
Interest Earned
$12,760,146.47
Total Receipts
$31,757,881.47
Interest Used
$5,175,203.48
Fund Balance
$26,582,677.99

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Watching What They Eat

*by Vic Venters*

Ever wonder what seeds are most nutritious and best for the various birds that visit your backyard feeders? Do you notice that some seeds are gobbled up and others are left wasting on the ground? Researchers at the Cornell Laboratory of Ornithology in New York would like to analyze your observations as part of the National Science Experiment Seed Preference Test. The lab's ornithologists are currently seeking 10,000 volunteers nationwide to participate in the test, which will document seed preferences of backyard birds.

The project will determine the types of seeds that birds visiting feeders prefer, and whether there are variations in seed choice based on regional, seasonal and species differences. The results learned from the nationwide experiment could allow backyard feeders to tailor their seed selection based on regional bird preferences.

The experiment runs through April 30 and you can sign up to join anytime during that period. Participants are asked to spend five minutes making specific observations at their feeder, either one time or on a weekly basis. The seeds being tested will be red milo, black oil sunflower and white millet. Sunflower and millet are widely available, but red milo can be difficult to locate on the East Coast. However, Cornell project organizers will provide the address of a seed source when you sign up. Prices will be wholesale plus postage.

Project participants also get a subscription to Cornell's quarterly newsletter, *Birdscope*, and a bird identification poster, among other materials. The project is being funded in part by the National Science Foundation, but there is a $7 fee to help cover the costs of data entry and analysis. Credit cards are accepted.

For more information, or to sign up for the program, contact the National Science Seed Preference Test, Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, N.Y. 14850-1999, or call 1-800-843-BIRD.

The ruby-throated hummingbird and other nongame species need your help.
You can help by contributing to the Nongame and Endangered Wildlife Fund.
See page 8 for details.
NORTH CAROLINA
NONGAME &
ENDANGERED
WILDLIFE
FUND
KEN TAYLOR

## "Speckulations"

A fine winter day—calm, not too cold—is a perfect time to fish for crappies, or speckles as they're often called hereabouts. And if the fish don't bite, you can occupy yourself wondering why you ever thought they might.

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# WILDLIFE IN NORTH CAROLINA

MARCH 1994 $1.50

# Greasy Burgers and Curb Service

*by Jim Dean*

I am so weak. Following a mid-January quail hunt at the farm, my son and I stopped to fill up at a Creedmoor service station that had a grill.

"Want anything to eat?" Scott asked as I filled the gas tank. I shook my head, but when he got back in the truck, I knew I was in trouble. His hotdog had soaked through its wrapper and smelled heavenly. Chili and slaw juice were dripping off his elbows by the time he'd polished off the dog and two hamburgers, and I had nearly run off the road twice just watching him.

"You want a bite?" he asked. No, I didn't want a bite. I wanted to go back and eat hotdogs and hamburgers until they were running out my ears. I managed to hold off for 24 hours, then at noon the following day, I slammed the door on a refrigerator full of health food and went looking for grease. A body—this body—can stand only so much clean living.

ILLUSTRATION BY JACKIE PITTMAN

This would never have been a problem if Scott had been eating a dog or burger from McDonald's, Hardee's, Wendy's or any other home of homogenized hamburgers. They're okay, but it takes a certain kind of hamburger to evoke my passion—one fried from a frozen start on a grill in a 1950s vintage joint and sloppily constructed using traditional ingredients that seem peculiar to this part of the mid-South. Let me describe one.

The burger is placed in a plain bun that has been steamed as soft as a baby's butt, then slathered with yellow mustard, chopped onions, chili (no beans) and minced, runny slaw. No substitutes. No exceptions, though it's permissible for a high school student anticipating a date within a week to eschew onions. Okay, rat cheese if you absolutely insist. The proper way to order a complete unit is "full dressed" or "all the way." The assembled burger is then wrapped in cheap waxed paper that will immediately become soaked with grease. The same ingredients apply to a hotdog, except the dog must be red enough to make you suspect that it was made from floor sweepings at the kind of meat-packing house that caused Upton Sinclair to go Commie.

If you are wondering if a charcoal- or flame-broiled burger can qualify, forget it. Same goes for ketchup, mayonnaise, pickles, relish, sauerkraut, sesame seed rolls and any other such stuff. I'd never even heard of putting lettuce and tomato on a hamburger until I was in the Army stationed on foreign soil (Maryland). For pity's sake, some places even put salad dressing on hamburgers! I hate to be provincial about this, but these are suspicious, imported practices. Travel outside this part of the South and try to get slaw or even chili on a hotdog or hamburger. You could be locked up for asking. Worse than that, lettuce and tomato have been allowed to fester here long enough for whippersnappers under 30 years old to think they belong. Oh, what's to become of us? Is no regional peculiarity safe from the melting pot?

In the days of our youth, Charlie Ogletree and I were collectors of vintage greasy burgers, dogs and the places that sold them. Just recently, we spent half a hour on long distance reminiscing about places we had frequented in the 1950s and '60s. One of our favorites was the Da-Nite Diner in Bethel when it was in a tiny, standing-room-only, faded blue brick carbuncle on the side of Wynne's Chevrolet. Somehow every fishing trip we ever took carried us through Bethel. The Da-Nite is still open, but it's moved around the corner into more spacious digs.

Other spots we would go out of our way to invade included the Radio-View Drive-In in Little Washington, The Creamery in Wilson, Mel's in Elizabethtown, Amos and Andy's in Durham, Darwin Water's Pure Station in Greenville, Ham's in Weldon, Zack's in Burlington, the Emerald Isle Pier grill and many, many others that have slipped my mind. I apologize if your favorite isn't among them. Some are history, some have gone upscale (alas), and some are still in business virtually unchanged.

Charlie also reminded me that some of these establishments once offered true curb service, a very rare feature today. You never went inside. Someone would come to the car, take your order, then deliver it on a window tray.

The Second Street Lunch in our hometown of Roanoke Rapids never offered curb service, and it has occupied three locations on the same block in my memory, but it's still legendary for its dark, spicy chili and burgers. My mother used to accuse me of coming home mainly to eat there, and it's true that I have eaten as many as six Second Street hamburgers at a sitting. Among the other Roanoke Rapids hangouts I recall were Mobley's and Ray's—both long gone.

When I grew up and moved away, a new friend in a faraway state one day remarked to me that "He wasn't going to take me to raise."

I was dumbstruck. "You mean you've been to Ray's?" I asked. He looked at me like I was crazy. You see, for all those years growing up, when anyone had used that old colloquialism, I had always assumed they meant they weren't going to "take me to Ray's." Well, sure, it had the same general meaning, didn't it?

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **Fishing Down Memory Lane** *written by Jim Simons* © 1994 *photographed by F. Eugene Hester* © 1994
*The angling can be notoriously difficult in those old millponds scattered throughout eastern North Carolina. And yet....*

8 **Rockfish on the Rebound** *by Kent Nelson*
*After a decade of decline, the striped bass population that spawns in the Roanoke River is rebuilding, but strict conservation will be needed to sustain the recovery.*

14 **The Complete Osprey** *by David Lee* © 1994
*Here's an aerial angler that seldom comes home empty-handed—make that empty-footed—but this now common raptor flirted with extinction just a few short years ago.*

20 **Desperately Seeking Salamanders**
*written by John Connors* © 1994 *illustrated by Jim Brown* © 1994
*If you're looking for love during the month of Valentines, you can surely find it in frigid waters in the dead of night.*

24 **Room at the Top** *written and photographed by Lisa M. Stroud* © 1994
*Summit-time and the living is easy on Mt. LeConte, the fourth highest mountain east of the Mississippi.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

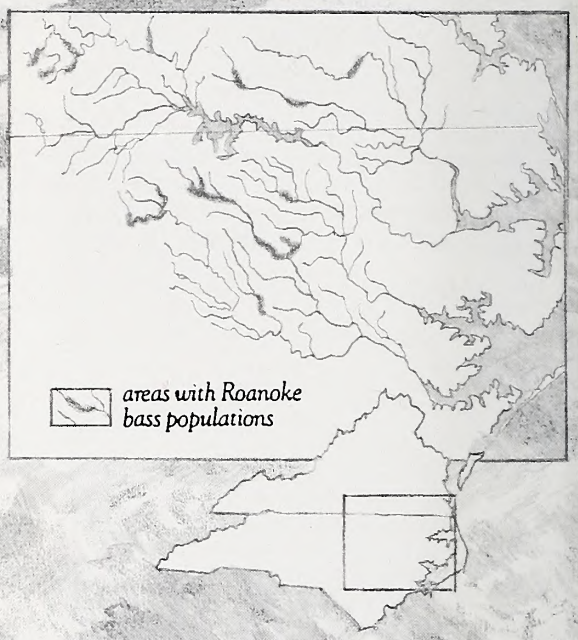
**Nature's Ways** *by Lawrence S. Earley*

**Back of the Book** *by Vic Venters*

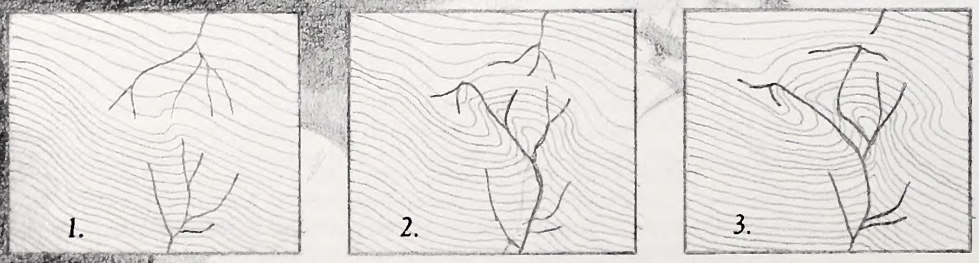
**Wildlife Through the Year** *by Vic Venters*

**Cover** *These striped bass are likely to have spawning on their minds this time of year. Photographed by Doug Stamm.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**




***The Roanoke bass is a** member of the centrarchid or sunfish family, and it has been found in warm, sandy and rocky streams in a variety of locations in North Carolina and Virginia. It likes to eat crayfish and small fish. It has been known to survive for seven years in the wild.*

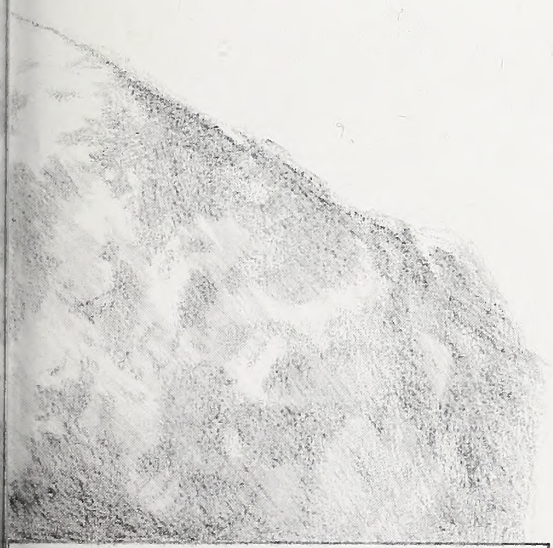


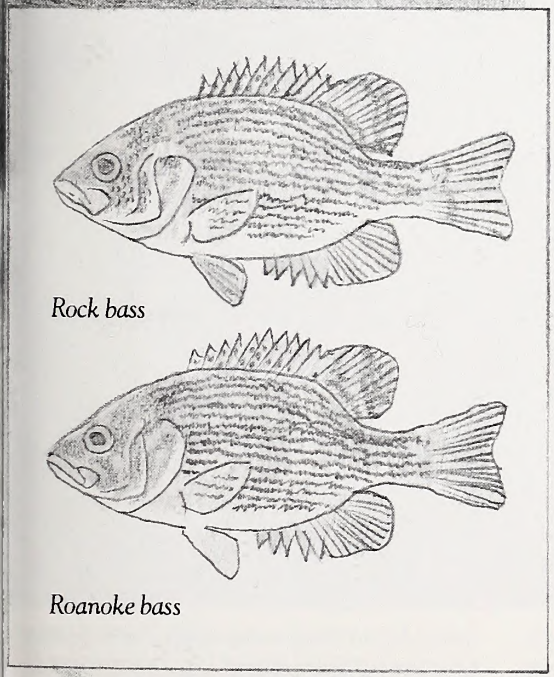

***Stream pirating** occurs when land between two streams erodes over time and the streams join (1, 2). Eventually erosion will even cause a small gap to occur in a ridge, enabling one stream's headwaters to flow into another (3).*

# A Case of Piracy

*written by Lawrence S. Earley/illustrated by David Williams*

*The Roanoke bass today occurs in streams belonging to the Roanoke, Chowan, Tar and Neuse river drainages. Through stream pirating, the bass or an ancestral form entered the Roanoke from the New River long ago. Subsequent stream pirating enabled the fish to expand its range into adjacent drainages.*





*Rock bass*

*Roanoke bass*

***The Roanoke bass** and the rock bass are nearly identical but can be distinguished. The rock bass has scales on its cheek, while the Roanoke bass has few if any. Viewed from the side, the line above the Roanoke bass's eye is usually concave, while on the rock bass it is nearly straight.*

How fish get from one place to another makes for some interesting speculation. Take the case of the Roanoke bass. This sunfish was first described in 1867 after a tiny 3-inch specimen was taken from the Roanoke River in Virginia. By 1962 it was considered extinct in North Carolina, but surveys in the Tar River a year later turned up numbers of the fish, prized by anglers for their fight and high food value.

North Carolina sports fishermen have often called it rock bass or redeye, but that's a case of mistaken identity. The Roanoke bass and the rock bass are almost identical—both fish have a large red iris, leading them to be called "redeyes"—but though the two belong to the same genus (*Ambloplites*), they are different species. Rock bass (*A. rupestris*) inhabit western-flowing streams belonging to the Mississippi drainage, and their distribution extends north all the way to Manitoba and Quebec and west into the Ozarks. The Roanoke bass (*A. cavifrons*), on the other hand, is limited to the tributaries of the Roanoke, Chowan, Tar and Neuse rivers, all of which flow east toward the Atlantic.

Yet the similarities between the two fish are puzzling. The other two members of the genus are located in the Mississippi basin; why is the Roanoke bass the only one found east of the Blue Ridge?

Scientists theorize that the Roanoke bass got to where it is today because of a geological phenomenon called "stream capture" or "stream piracy." The term means exactly what it says. Imagine two streams lying on either side of a ridge and belonging to two different river drainages. On the lower slope, Stream A, perhaps flowing through softer sediments or down a steeper gradient, gradually erodes the slope below Stream B, drawing closer and closer. Eventually the two are so near that one day the soil gives way, and because water always flows to the lowest point, Stream B now flows into Stream A. In geological terms, Stream B has been captured by Stream A.

If Stream A is part of the Atlantic Slope—or river drainages flowing toward the sea—and Stream B is part of the Mississippi River basin, then interesting things may begin to happen, biologically speaking.

Scientists speculate that the close kinship between the Roanoke bass and the rock bass is biological evidence that long ago the Roanoke, a major river system on the Atlantic Slope, pirated one or more of the tributaries belonging to the New River, a major river system of the Mississippi Basin. Isolated from the main population, one of the fish species that passed from the New to the Roanoke—either the rock bass itself or some ancestral form of both rock bass and Roanoke bass—began to change its characteristics. Over many years, these changes might have resulted in a completely different species, the Roanoke bass.

How did the fish get from the Roanoke river drainage to the Tar and the Neuse? Piracy again. A look at a map will show that the Roanoke's drainage is very close to the Tar's, as is the Tar's to the Neuse's. A tributary of the Tar could have captured a stream belonging to the Roanoke, thus introducing the bass into its waters. From there it might have spread to the Neuse drainage.

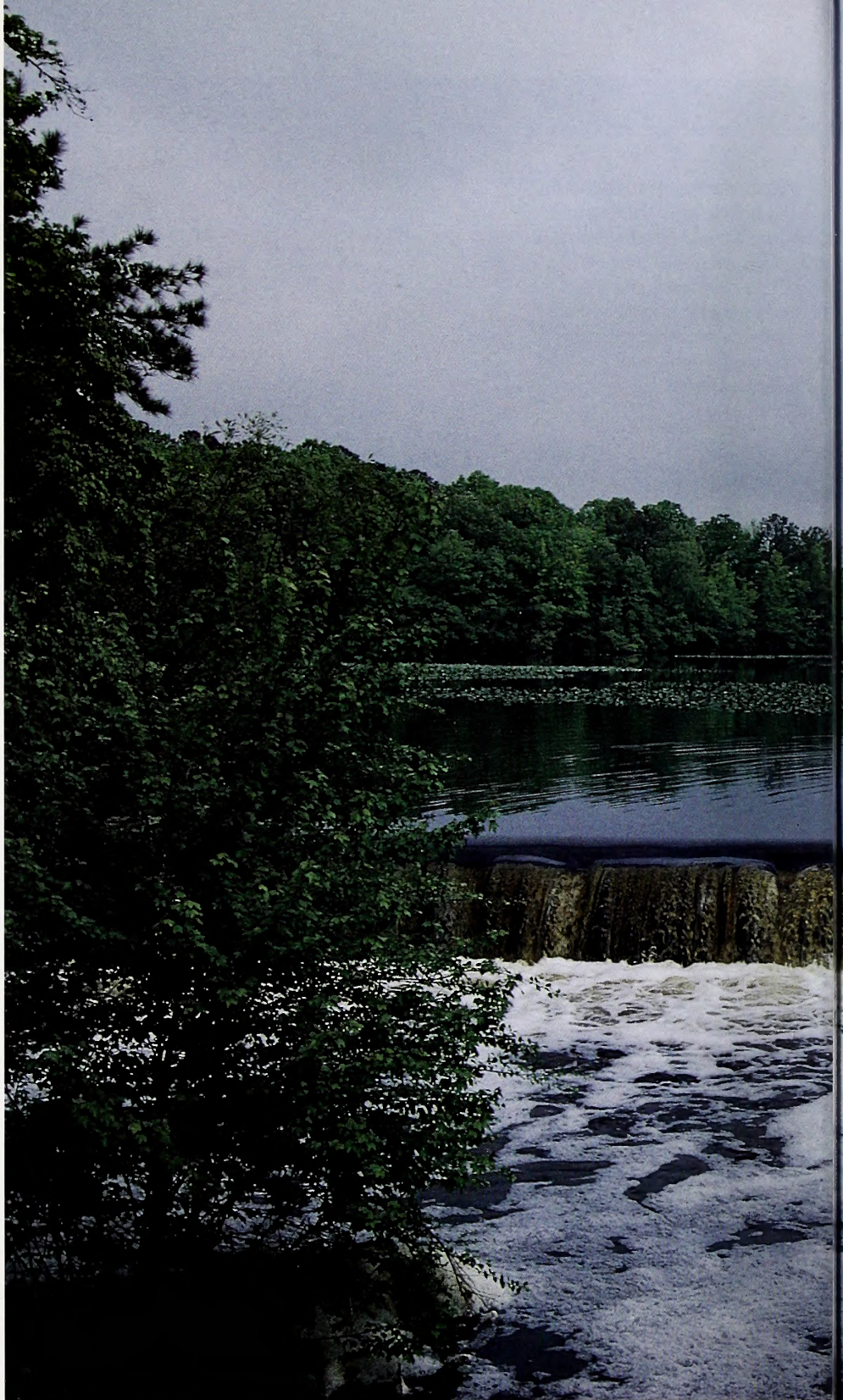
Of course fish from a pirated tributary could well be outcompeted by native species and die out. But there's no reason why several piracies couldn't have occurred over tens of thousands of years, with conditions in the stream changing eventually to enable the fish to take hold.

The Roanoke bass has had an interesting history indeed.

# Fishing Down Memory Lane

The angling can be notoriously difficult in those old millponds scattered throughout eastern North Carolina. And yet....

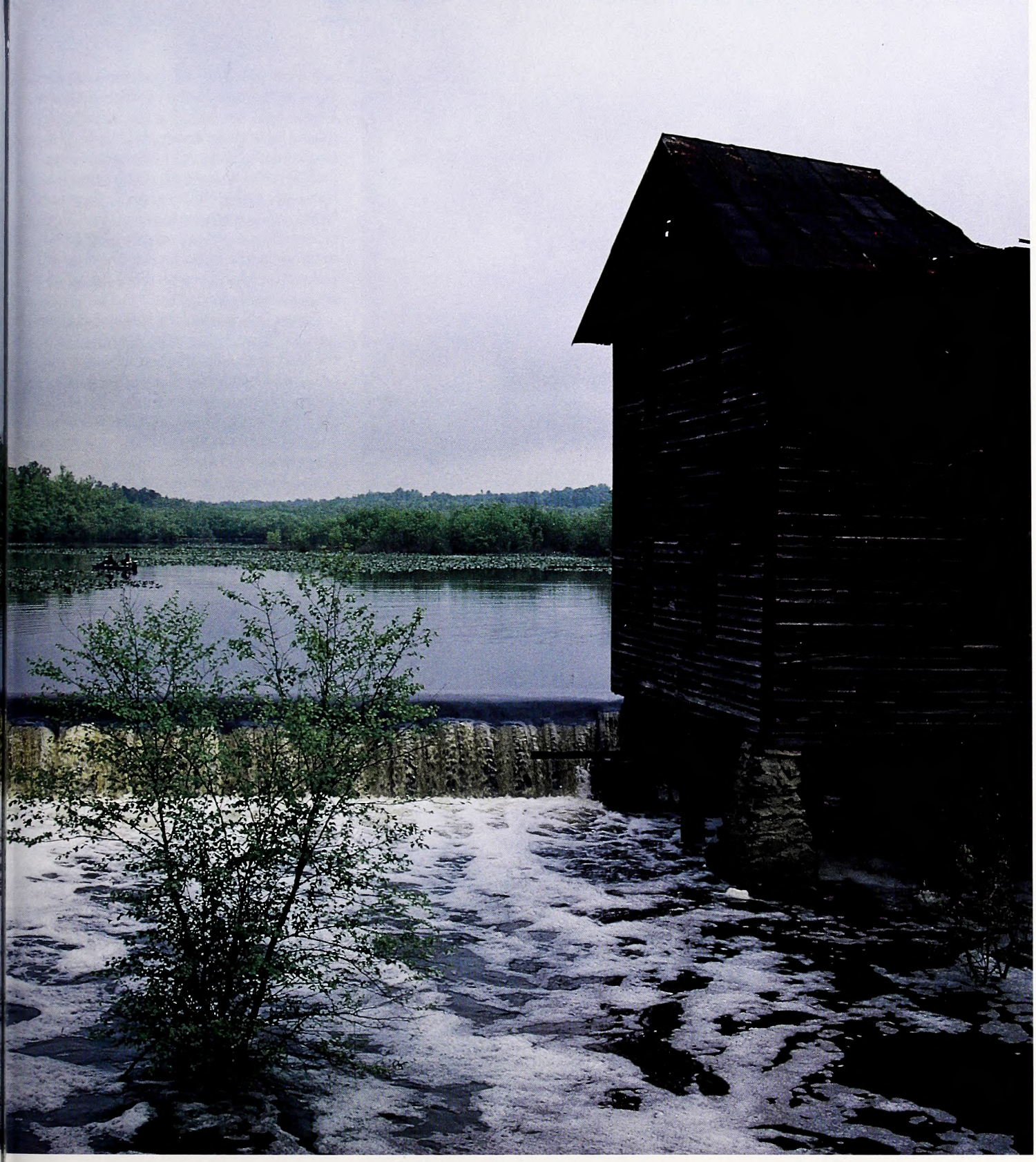
written by Jim Simons © 1994
photographed by
F. Eugene Hester © 1994



Every angler has a fishing fantasy. For many, that fantasy involves a secluded lake with dark, shallow, stump-filled waters lined with weed beds; a place so fishy-looking that the anticipation is immense even before the first cast is made. We half-believe that a cast anywhere could result in the jolting strike, and the only competition we'll see all day is the osprey circling overhead.

Take heart. Such places can still be found nestled off the backroads of eastern North Carolina where old mill dams hold back some of the fishiest-looking waters to be found anywhere. These shallow lakes are a labyrinth of cypress or tupelo gum trees and stumps, lily pads and weed beds. Many were impounded in another era to provide power to grind grain to meal and, as such, were the state's first reservoirs. Many still survive as a testimony to early American ingenuity, and they provide a haven for a variety of gamefish. Years of natural growth around and within these waters give these millponds a secluded, almost primeval look. Indeed, these lakes appear undisturbed since a time long past when their waters turned the millstones.

For the relatively few anglers who spend time on these waters, millponds can produce some noteworthy catches. Each year trophy largemouth bass and chain pickerel, as well as



stringers of crappie, yellow perch, fliers and bluegills, are caught by those willing to expend a little extra effort to locate these hidden gems and learn how to fish them.

One reason that these fishing holes have been left relatively undisturbed over the years is because they aren't all that easy to find. Most are located off the secondary roads, and with their tree-studded shorelines and cover-filled lake areas, they are easy to miss unless the old millhouse is still standing. Millponds do show up well, however, on county road maps and topographical maps where they are usually just upstream from secondary highways that follow earlier, more primitive roads. In some areas, they are still the only lakes of any size in the county. Millponds are very numerous along the fall line where the Piedmont meets the Coastal Plain, especially in Wake, Wilson, Nash, Johnston, North-

***These fishermen*** *on picturesque Yate's Millpond in Wake County may not bag a lunker bass, or even a decent stringer of panfish for supper, but they could hardly beat the scenery.*

***There's more to** millpond fishing than handsome scenery. Fishermen will find a wider variety of species to catch in most of these old lakes, and a combination of patience and skill can result in some good catches.*

hampton, Cumberland and Sampson counties, but they are also scattered throughout the eastern counties.

A publication by the Graphic Press titled *A Catalog of the Inland Fishing Waters of North Carolina*—long out-of-print but available at many libraries—is very useful in providing millpond information. Although it is old—based upon a study by the N.C. Wildlife Resources Commission in 1958—the book still provides good information about the location and size of the lakes.

With the exception of Merchant's Millpond State Park, all millponds are privately owned. Many are posted or leased to fishing clubs, but quite a few others still allow public fishing, usually for a small fee. A few still rent boats. Often a country store is located near the millpond where you can determine who to see about fishing. Such stores can also usually supply snacks and, sometimes, bait.

Bank fishing from the dam or fishing in the tailrace below the dam can be good; however, a small boat is usually needed because of the limited bank access and because the better fishing is usually away from the shore. Developed ramps are rare, but a 10- to 14-foot wooden or aluminum johnboat can usually be launched near the dam. An electric trolling motor is usually all the power you need, but plenty of fishable water can be reached by simply paddling. A long, sturdy paddle is useful to push off from shallow areas or to dislodge the boat from a slightly submerged stump. The paddle will also double as a depth finder because the water in most of these old lakes is rarely over 5 feet deep except near the dam.

One good way to start fishing is to use a small live bait as a "fish finder" to locate a general area of the lake where the species of fish you're seeking seem to be biting. Often several species will congregate in the same part of the lake. Once you've targeted your quarry, you can change baits or switch to lures that may be more effective. Minnows are the primary prey for the bass, crappie, pickerel, flier and yellow perch that abound in these waters, and nothing can beat a small minnow for consistent action if you don't mind surprises. If you want to be more selective toward sunfish, crickets and red worms are a good choice. On the other hand, if nice bass and pickerel are desired, larger minnows are a better bet.

With artificial baits, the smaller lures will also get more action. For the die-hard bass angler, the plastic worm, spinnerbait and thin minnow imitators are hard to beat. The normally shallow waters particularly lend themselves to good top-water action in the early morning or late evening during warm weather. A small spinner could be considered the universal bait here and will catch most any kind of fish in the lake. In-line spinners such as a Mepps Aglia are great, but the treble hook snags a lot in these waters. A 1/32- or 1/16-ounce Beetle Spin-type lure or a small spinnerbait hangs up less and still catches a lot of fish. Light tackle is fine to handle these small baits, but you may want to add a "shock" leader of several inches of heavier line on the end to minimize the loss of lures to the toothy pickerel (jack) and bowfin (blackfish) that are particularly fond of these lures.

Larger fish, particularly bass and crappie, are usually caught around cover away from the shallow shoreline. When the entire lake is only 2 to 4 feet deep with plenty of offshore cover, fish have little reason to relate to the shoreline, regardless of how fishy it appears. In most cases, the water along the shoreline is very shallow and mushy, and perhaps more acidic. For whatever reason, usually only smaller fish will be caught next to the shore. An exception to this is the steeper shoreline of the earthen dam, which is usually a pretty good spot. Often any outer line of trees away from the shore, or a weedline, can also be good. But the best fishing will still most likely be around visible or submerged cover away from the shore.

Short, accurate casts to visible cover are usually the preferred fishing method. Often the casts have to be within inches of the cover to draw a strike. Try to cast just beyond the cover so that the retrieve covers the back, side and front of the object. If possible, cast so that you can retrieve the bait past several stumps or trees on the same cast. With so many fishy-looking spots, it is best to try to cover as much water as possible. The strike will most often occur just as the lure passes the cover. But be prepared for a strike anywhere.

My father-in-law, Richard Best, taught me the value of fishing open water. What he discovered is that this apparently "open" water often holds submerged weeds or stumps that attract fish passed over by anglers who cast only to visible cover. There are many stumps, logs and weed beds that aren't visible, yet they harbor fish. An efficient angler can add a few more fish to the daily tally by just trolling between casting areas. Another way to locate fish in an expanse of open water is to fan cast with a lure that is designed to be rapidly retrieved, like a buzz bait or shallow-running plug.

A little advance knowledge of where the submerged cover is located can pay off in big rewards. I well remember being told to cast to an open water area where my partner knew that an old brushpile had fallen below the surface. The cast was generously rewarded when a 6 ½-pound bass inhaled my Big-O as it bobbed on the surface. A depthfinder can also help you locate submerged cover,

but you may need a portable unit.

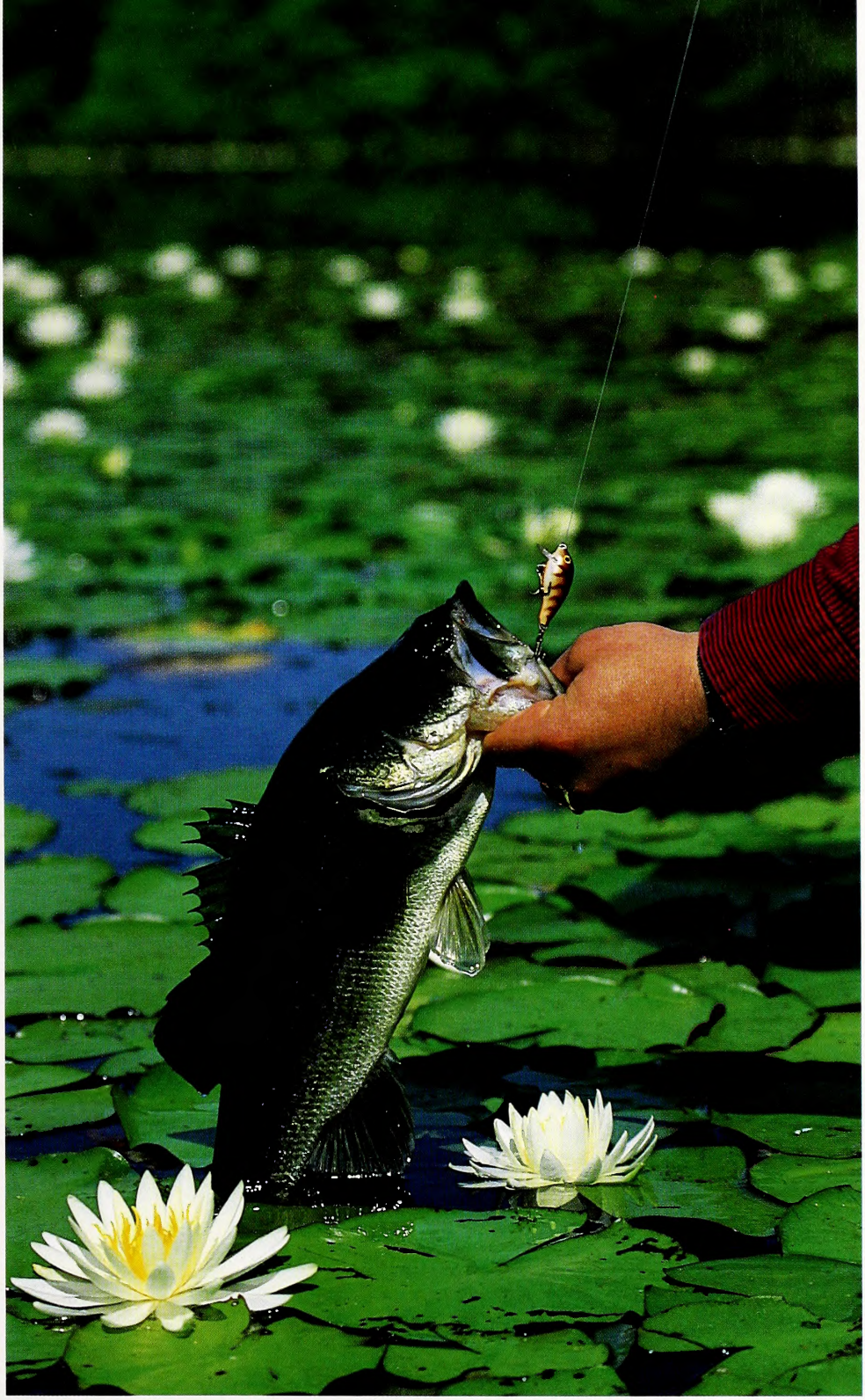
It is important to try to determine the kind of pattern fish are using on any particular trips. Try different kinds of cover and circumstances until you find fish, then make a note of the type of cover, wind and shade conditions. Chances are, you'll do best duplicating the cover and conditions in other parts of the pond—at least on that trip, anyway.

I recall one day when I could catch bass only at lone standing cypress trees, and I concentrated on them. On other days, the key has been submerged tree limbs. On another occasion, plenty of bluegills and crappies could be caught only by slow-trolling small spinners through an open area of the lake instead of tight to the trunks of the standing trees. The sun and wind can also concentrate the fish on a certain side of the lake or even on one side of clumps of cover. Don't be reluctant to move and try new things until you connect with some fish and determine a pattern.

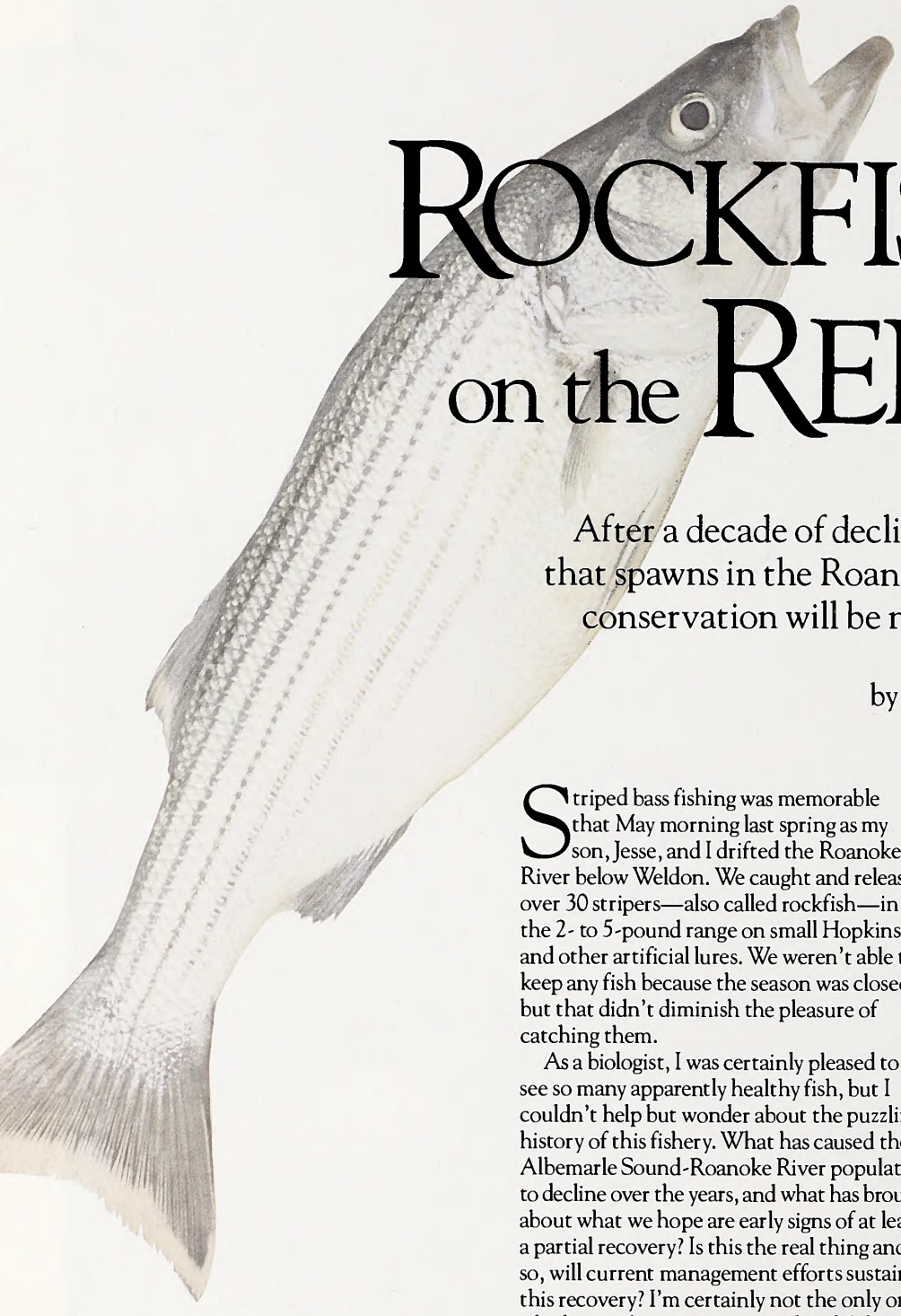
Although the millponds may appear to be teeming with fish, the actual fishery productivity usually lags considerably behind the popular reservoirs. According to Pete Kornegay, Wildlife Commission fisheries biologist for District 1 in the eastern part of the state, millponds frequently have a high population of rough fish, and relatively few game fish. The waters are also usually acidic because of all the tannin in the waters from leaves and old trees, sometimes too acidic for game fish. Yellow perch, flier and pickerel tolerate these conditions better than largemouth bass, so the bass population is often more limited. Some drained millponds have been found to have a gap in the sizes of bass—a lot of small bass and a few very large ones (7 pounds and up). Often, there are few bass in the 3- to 6-pound range. For whatever reason, some millponds definitely provide better fishing than others, so it helps to ask around. Some very poor fishing exists in some very fishy-looking water.

One appeal for the hard-core angler is that fishing is often good at millponds when it's slow elsewhere. My favorite times to fish millponds are during the dead of winter and during the "dog-days" of summer. With the variety of fish available within the confines of shallow water, some kind of fish is almost always willing to bite. Pickerel, yellow perch and crappie will bite all winter on minnows or small bass baits. As the water warms, sunfish and bass are caught more regularly, adding to the variety. During midsummer, when reservoir bass have retreated to deep water, I have had excellent luck in millponds with topwater baits for bass in the early morning and with plastic worms as the sun climbed higher.

The good, off-season fishing is only one of the attractions to eastern millponds. These lakes of a bygone era offer a rather unique fishing opportunity. The variety of sporting fish better ensures a tug on the line while keeping you guessing what will bite next. Indeed, the natural beauty around you, and all the fishy-looking spots may keep you casting optimistically, even if you don't catch fish. Most anglers find this millpond fishing very appealing and with a little imagination, you can feel a kinship to the anglers of an earlier generation who parked their mule-drawn wagons and fished the same waters with cane poles while waiting for their wheat or corn to be ground.



***Many old millponds** are well past their prime and too acidic to support large numbers of bass. Indeed, studies show that most millponds contain populations of smaller bass like this one, with very few fish in the 3- to 6-pound class. Yet, there are usually a few real double-digit lunkers to keep matters interesting.*



# ROCKFISH on the REBOUND

After a decade of decline, the striped bass population that spawns in the Roanoke River is rebuilding, but strict conservation will be needed to sustain the recovery.

by Kent Nelson

Striped bass fishing was memorable that May morning last spring as my son, Jesse, and I drifted the Roanoke River below Weldon. We caught and released over 30 stripers—also called rockfish—in the 2- to 5-pound range on small Hopkins and other artificial lures. We weren't able to keep any fish because the season was closed, but that didn't diminish the pleasure of catching them.

As a biologist, I was certainly pleased to see so many apparently healthy fish, but I couldn't help but wonder about the puzzling history of this fishery. What has caused the Albemarle Sound-Roanoke River population to decline over the years, and what has brought about what we hope are early signs of at least a partial recovery? Is this the real thing and, if so, will current management efforts sustain this recovery? I'm certainly not the only one who hopes the once-renowned rockfish runs of years past will again become an annual spring event.

Sampling by state agencies and increasing catch rates of striped bass by fishermen over the last few years indicate the population is rebuilding. Clearly, the situation has improved since Tony Mullis wrote "Can Stripers Turn the Corner?" (April 1989). At that time there was little to be optimistic about.

The Albemarle Sound-Roanoke River population, an important fishery since the late 1800s, plummeted during the late 1970s and 1980s with significant declines in the number of fish caught by commercial and recreational fishermen. Reproduction problems became apparent in the late 1970s with fewer young (juvenile) striped bass being found in western Albemarle Sound during summer-fall sampling by N.C. Division of Marine Fisheries. This annual sampling, which has been conducted since 1955, provides the Juvenile Abundance Index (JAI), an indicator of annual reproductive success. With the exception of moderately successful spawning in 1977 and 1982, the period from 1977 until 1988 had poor reproduction.

Historically, however, reproductive success of striped bass has always varied greatly from year to year, and it was the periodic occurrence of good year classes that sustained the large commercial and recreational harvest of years past. Continued fishing pressure and harvest prior to and during the 10-year period of poor reproduction undoubtedly contributed to the collapse of the population. The underlying questions remained, however. What factors influenced the observed variability in reproductive success among years and why were dominant year classes not produced during this period? Mullis' article reviewed research efforts to try to identify factors responsible for poor reproduction and also discussed the effects of Roanoke River flows on spawning success. It also considered the impacts of overfishing and, possibly, the effects of poor water quality on fish survival. Still, the only hint of improvement Mullis noted in stock condition in 1988 was an increase in the JAI that year.

Since 1988, however, good reproduction has occurred in 1989 and 1993, with 1993's

***Biologist** Kent Nelson shows off a big spawning female striped bass that was captured by electro-shocking in the Roanoke River as part of the Wildlife Commission's on-going study. These fish are only momentarily stunned, and are safely released once their vital statistics have been recorded.*

# Roanoke River Flows Critical to Successful Striped Bass Spawning

Construction of dams on the Roanoke River between 1950 and 1963 (Kerr, Gaston and Roanoke Rapids) and the operation of these reservoirs for flood control and hydropower production disrupted a riverine and swamp forest ecosystem that developed over thousands of years. While people have benefitted from relief from disastrous flooding and increased electrical production, negative impacts to natural resources and downstream users of the river have also resulted. In 1955 the Steering Committee for Roanoke River Studies, composed of governmental agencies and private groups, was formed to resolve conflicting uses of the river. Within the recommendations of this group were provisions for water releases to maintain striped bass spawning. Spring water releases for striped bass were further formalized in 1971 with an agreement between the U.S. Army Corps of Engineers, which operates Kerr Reservoir; Virginia Electric and Power Company, which generates power from Gaston and Roanoke Rapids lakes; and the Wildlife Commission. This agreement provided for the maintenance of minimum flows during the spawning season.

Flow recommendations for striped bass spawning were re-evaluated by the Roanoke River Water Flow Committee, formed in 1988 by representatives of state and federal agencies and universities. The purpose of the committee was to gather information on Roanoke River resources and recommend a flow regime beneficial to striped bass, to other resources, and to downstream users. An "experimental" flow regime for the Roanoke River was developed that more closely resembled pre-impoundment conditions to which striped bass and other species were adapted. Minimum, maximum and target flows, based on historical discharge data, were established. To reduce the variability of flows caused by peaking power production, the hourly variation in flow was also limited. During the six years that this flow regime has been in place (1988-1993), moderate to good reproduction occurred during three years (1988, 1989 and 1993). It appears that the revised flows, along with other management measures, have benefited striped bass recruitment.

Spring flows in the Roanoke River set the stage for striped bass spawning and are a principal component in determining reproductive success. William Hassler of N.C. State University pioneered recent research on striped bass beginning in the mid-1950s. His analysis identified a link between moderate spring flows and good striped bass reproduction. This was subsequently affirmed in work by the Flow Committee, which determined that the flow patterns in years of good reproduction observed since completion of the dams more closely resembled pre-impoundment flows than did the years of poor reproduction. Poor reproduction was frequently observed during years of either high or low flows.

Studies by Roger Rulifson and colleagues at the Institute of Coastal and Marine Resources at East Carolina University indicate a complex relationship between flows, the abundance and distribution of the planktonic food base, and the distribution and feeding activity of larval striped bass. High flow conditions during the late winter and early spring tend to promote the development of plankton communities that may relate to a greater discharge of nutrients and to an increase in available floodplain habitat. Peak densities of plankton do not persist under continued high flows. Such flows may also flush developing striped bass out of the most productive areas of the Roanoke River delta and into Albemarle Sound during the early feeding period. Moderate flows, however, appear necessary later in the spring to transport young stripers into Albemarle Sound. During low flow years, generally associated with warmer water temperatures, larvae develop quicker and may enter the critical initial feeding stage before reaching the most productive areas within the lower Roanoke River.

The effects of the reduction in the magnitude of hourly changes in flows on the spawning grounds during the experimental flow regime are difficult to assess. Less variable discharges likely have enhanced spawning by stabilizing conditions. Fishermen have long observed that changing flows cause striped bass to feed less on the spawning grounds. ECU studies also have indicated that releases of cool water will cause striped bass to stop spawning if water temperatures drop below 18 C (64 F). Sampling of the spawning stock by the Wildlife Commission has found that striped bass will move over several miles on the spawning grounds in response to major changes in discharge. Rapid changes in flows, resulting from peaking power production, may therefore disrupt spawning by stimulating movement of striped bass seeking optimum flow conditions. Future work will help clarify the relationship between flows in the Roanoke River and striped bass, as well as other fish and wildlife populations.

GERALD ALMY

JAI the highest ever recorded. Other recent improvements have been observed. Sampling by the N.C. Wildlife Resources Commissions' Division of Boating and Inland Fisheries also indicates a relative increase in the number of female striped bass on the Roanoke River spawning grounds during the spring. Furthermore, sampling on the Roanoke by Roger Rulifson of East Carolina University has shown an increase in the number of striped bass eggs spawned each year since 1989, and markedly so in 1992 and 1993. These trends indicate that the striped bass population is in the recovery phase and that stocks are rebuilding.

But why? The success seems to be closely related to various management activities in recent years. Two main keys are the modification of flows within the Roanoke River during the spring, and limitations placed on the harvest. The life history of the species must be reviewed, however, to understand the influences of environmental factors and management activities on the population. Striped bass have a complex life cycle, as do other anadromous species that migrate between fresh, brackish and salt water. Because stripers are dependent on various habitats and associated food webs, as well as, environmental conditions at different life stages, there are many potential influences and interactions that determine striped bass survival.

The annual cycle begins in late winter and early spring as striped bass congregate in western Albemarle Sound prior to the annual spawning migration. Beginning in late March and April, striped bass ascend the Roanoke River to the spawning grounds located between Halifax and Roanoke Rapids. Spawning is concentrated in the vicinity of Weldon, about 130 miles above the Albemarle Sound.

Female striped bass, surrounded by males, release eggs into the river that are then fertilized in a splashing mating ritual observed at the surface and called "fights" by local fishermen. Broadcast spawners like striped bass do not provide care for their eggs or young as do other species such as largemouth bass and catfish. Their reproductive strategy is to spawn large numbers of eggs to compensate for the lack of parental care and resulting low survival rates. Researchers have found that female striped bass between 7 and 16 years old can produce from 1 to 4 million eggs per year. After release, the semi-buoyant eggs swell, become translucent and are transported downstream by the river current. After about two days, eggs hatch in the mid-reaches of the river in the vicinity of Palmyra and Hamilton. The newly hatched stripers, called "larvae," develop from nutrients supplied by their yolk sacs as they continue to be carried downstream toward Albemarle Sound. Water temperatures greatly influence larval development, which occurs at a quicker rate at warmer temperatures. After about four days their mouth parts are sufficiently developed to begin active feeding. Larval striped bass develop through three stages with metamorphosis complete 34 to 50 days after hatching. At this point, the "juveniles," at a little over 1-inch long, finally resemble adult fish. Young striped bass typically spend their first few years within Albemarle Sound and its tributaries.

KENT NELSON

***Most of the** stripers caught in the Roanoke are about the size of this one caught by Kent Nelson (above). Larger fish (opposite page) are more likely to be females. The season is closed each year after a certain quota has been caught. This ensures that the population can continue to rebuild, although anglers can still fish if they release their catch.*

The initial feeding period is critical for young striped bass that, naturally, suffer tremendous mortality during these first few months of life. Flows within the Roanoke River are especially important during this period and, in concert with water temperatures, influence both the rate of development and transport of young striped bass. Flows and water temperature also influence the development of the food chain in the lower river upon which the young fish depend. The relationship between flows and striped bass spawning success has been recognized since the 1950s, and has been the focus of many research studies and negotiations on the operation of upstream dams (see "Roanoke River Flows," p. 10).

By late summer and early fall of the stripers' first year, natural mortality factors, including predation and starvation, have taken their toll, and the mortality rate begins to decline as the fish grow. The relative "success" of reproduction for the year has been established by this time, which is estimated by the Division of Marine Fisheries' JAI. This

GERALD ALMY

KENT NELSON

index provides fisheries managers a good indication of the numbers of fish that will survive and grow big enough to become part of the fishery in coming years.

While some striped bass remain in coastal rivers throughout the year, most begin to leave the spawning grounds of the Roanoke River in late May and early June. Movements of adult striped bass, however, are not fully understood. Tagging studies have shown that some bass leave the Albemarle Sound and migrate along the Atlantic coast, as do stripers from Chesapeake Bay and Hudson River. Studies tracking the movements and migration of adult striped bass with radio transmitters were initiated in 1993 by N.C. State University under the direction of Joe Hightower. This work will help clarify specific move-

***Striper spawning** in the Roanoke River generally peaks in April, but even after the season closes, good catch-and-release fishing can continue into early summer (left). Wildlife Commission biologists weigh and measure fish as part of their annual survey.*

ments of striped bass both during and after the spawning migration and will measure associated habitat characteristics, including water temperatures and salinities.

While flows set the stage for spawning and affect environmental conditions within downstream nursery areas, humans are the primary influence on the adult striped bass population. While natural mortality factors continue, fishing mortality—which includes legal and illegal harvest by recreational and commercial fishermen—becomes relatively more important. Furthermore, additional mortality in commercial fisheries occurs from bycatch in fisheries targeting other species, from the release of fish measuring below the legal length, and from release of fish in excess of possession limits. Recreational fishermen also cause additional mortality through catch-and-release fishing.

The rebuilding of the population and the growing numbers of striped bass observed by fishermen has resulted in greater interest in the striper fishery, and it has increased public and political pressure on conservation agencies to liberalize harvest before the stock has fully recovered. While the interests of fishermen are integral in management decisions, it is ultimately the responsibility of resource managers to determine sustainable harvest levels that will allow the Albemarle Sound-Roanoke River striped bass population to rebuild.

The migration of striped bass between fresh and brackish water and into the Atlantic Ocean places the species under the management jurisdiction of three entities—the Wildlife Commission, Marine Fisheries Commission and the Atlantic States Marine Fisheries Commission (ASMFC), which establishes management guidelines for striped bass for Atlantic states from Maine to North Carolina. A management plan for estuarine stocks of striped bass in North Carolina, prepared by the two state agencies in coordination with the U.S. Fish and Wildlife Service's South Atlantic Fisheries Coordination Office, was submitted to ASMFC for review in November 1993. The ASMFC analysis will indicate if regulatory measures proposed by the state agencies will promote the timely recovery of the stock.

Since the 1980s, recreational and commercial regulations have become increasingly restrictive so as to limit fishing pressure and harvest on striped bass. These regulations include increased size limits, decreased creel limits, and commercial gear restrictions. Since 1990, a harvest quota, based on an 80 percent reduction of the average total harvest from 1972 to 1979, has been used to reduce harvest of striped bass in the Albemarle Sound and Roanoke River. The quota, based on ASMFC guidelines, was apportioned between the recreational and commercial fisheries. Management agencies use surveys of fishermen and mandatory reporting by fish processors to estimate the harvest and close the fisheries as the annual quotas are met.

The rebuilding striped bass population will require careful monitoring to estimate harvest and to determine fishing mortality rates. Because striped bass populations produce good year classes on an irregular basis, enough spawners must be protected to carry reproduction through years of poor reproduction. Considering the low survival rate of eggs and fry, chances of survival are certainly enhanced by providing a large number of spawners. While sampling by Wildlife Commission biologists on the Roanoke River spawning grounds indicates that the number of females has increased, relatively few fish are more than four years old. Harvest restrictions and other management measures should increase the numbers of older fish in coming years.

The U.S. Fish and Wildlife Service has provided additional assistance by developing population models that evaluate annual mortality rates. These models estimate the percentage of annual declines of striped bass year classes and indicate if fishing rates conform to those established by ASMFC for recovering populations. Future challenges to management agencies include the reduction of mortality from commercial bycatch and catch-and-release sportfishing, which will increase as stocks rebuild.

The Albemarle Sound-Roanoke River population is rebuilding through a combination of better management of river flows in the spring and restrictive harvest measures by management agencies. However, the protection of habitat quality represents a third, but no less important, component in maintaining a healthy ecosystem. Water quality is directly linked to human activities within the river basin, and problems are indicated by periodic algae blooms and reduced levels of dissolved oxygen in the lower river and parts of Albemarle Sound. Demands for water from the Roanoke basin, including the proposed water supply withdrawal of 60 million gallons per day from Lake Gaston by the city of Virginia Beach, will increase in the future and affect the quantity of water available in the lower Roanoke River. Nonconsumptive withdrawals, point and nonpoint pollution and upland habitat development will degrade water quality.

Only time will tell if uncontrolled growth and the degradation of natural resources will be allowed to lower the quality of all life in this river and estuary. Only by balancing development with environmental considerations will we be able to assure that future generations will also be able to enjoy striped bass and other resources of the Roanoke River.

That kind of challenge is more than enough to give a biologist pause while he watches his son enjoy the kind of striper fishing that could still be little more than a memory in the future or if the present hopeful trend doesn't continue. ☐

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*Kent Nelson is the coastal region fisheries research coordinator for the N.C. Wildlife Resources Commission.*

# THE COMPLETE Osprey

Here's an aerial angler that seldom comes home empty-handed—make that empty-footed—but this now common raptor flirted with extinction just a few short years ago.

by David Lee © 1994

*"Feet roughly granular-retiulate. Toes free to base, the outer versatile. Talons of equal length, subylindrie."*

This is the way biologists say ospreys, or fish hawks, have unique and impressive feet. They have fabulous feet, feet perfected through millennia of time, feet unlike those of any other bird. All raptors have long, sharp talons, as does the osprey, but ospreys have a hind toe as long as the other toes. Their outer toes also rotate and are reversible. The talons are stout and are all equally curved. The result is a hand-like claw that can efficiently lock into prey. Take a closer look at the undersides of their feet and you'll find they are covered with pointed prickly scales that help the birds maintain a grip on slippery fishes.

How efficient are these specialized feet? While it would be easy to cite the studies on the foraging success of ospreys, I think I will answer the question with a simple personal observation. Several years back I watched an osprey fly off with a 3-foot eel and carry it to a feeding perch a quarter of a mile away. The only way I can carry, or even hold, a live eel is in a bucket with a good lid.

Years ago I lived on a lake and spent hours watching ospreys fish. Flying, circling and hovering, they patrolled the lake's surface looking for fish that ventured near the surface. It was fun to keep score. The birds fly 30 to 90 feet above the water, so when they actually go after a fish they can't just make an idle pass. After they spot a fish they usually hover momentarily waiting for the proper instant to strike. Controlling the timing and speed of descent, the osprey enters the water talons-first with its wings extended above and stretched behind its body. The force of impact on the water varies with the depth of the prey, but typically the birds hit at 15 to 40 miles per hour. Most often ospreys select fish swimming just below the surface of the water, but occasionally the fish is so deep that the bird will plunge into the water and for an instant disappear completely. Rising from such a dive requires a powerful down-stroke of wings to lift the bird from the water. Resuming flight, ospreys shake the water from their plumage. If the strike is successful, the fish, secure in the talons, is shifted so that it faces headfirst, making flight more aerodynamic.

My scores show the birds make captures on 50 to 80 percent of their dives. Dives from a hovering position appear to be more successful than those attempted from direct flight. Weather conditions—winds make waves—and water clarity are factors that, although hard for me to measure, obviously influence fishing success. Additionally, numbers of fish near the surface may be affected by these and other conditions. In fact, when conditions were not right, the ospreys simply moved to another lake or distant part of the one I was watching. Regardless of scores, it is clear that even when they are having a bad day ospreys are great fishermen. Researchers watching ospreys have noted that most birds, once they begin hunting, are able to capture a fish in about 12 minutes. Several observers have reported seeing ospreys catching two fish in a single dive, one with each foot.

Ospreys are the only living bird that have combined the plunge-diving fishing technique with a raptoral foot. These remarkable feet are responsible for the osprey's success. This bird is so successful, in fact, that along with the barn owl, it has the widest range of

***Each year,** ospreys are becoming a more common sight in North Carolina, particularly in the coastal region.*

YEAR OF THE COAST

# THE COMPLETE Osprey

**Alongside an** *unhatched egg, this two-day old chick (right) begs for a meal of fish. Eggshell thinning, caused by DDT, was one of the chief reasons that osprey populations crashed in the 1950s and 1960s.*

KEN TAYLOR

any non-oceanic bird in the world. Both birds are found on every continent, and throughout every continent except Antarctica.

The osprey's superb grasping abilities allow ospreys to take a wide variety of piscatorial prey. Ospreys simply eat fish, and any fish in the right size class that comes near the surface is fair game. Even bottom-dwelling fishes, such as winter flounder, may be taken at low tide. In most areas species of little economic importance make up the bulk of the bird's diet. For example, threadfin and gizzard shad comprise an important part of the ospreys' prey base in the Southeast. Fish are high in protein and four to six fish a day is enough to support a nest of growing young. Adults usually eat about 6 ½ pounds of fish per day. Fish hawks typically take prey in the 4 ½- to 12-inch size range. The largest prey item recorded to be taken by an osprey is exceptional—a 22-pound pike taken in Norway. There have been a few reports of ospreys underestimating the size of the target fish and being pulled under water after

LYNDA RICHARDSON

they had locked their talons into their prey. Drowned ospreys with large dead fish in their talons have been found washed up on lake shores.

Other adaptations also contribute to the ospreys' ability to hunt. These birds have an extremely thick tarsus; these strengthened leg bones not only help in absorbing the shock of the power dives, but also provide an additional surface area for attachment of the muscles that work the feet. The pale coloration of the osprey probably limits its detection by fish from below. A dark face mask helps to reduce the glare coming from the water. A long wing with a crook at the wrist helps the birds hover over prey. An extremely long, thin intestine maximizes the digestion of fish. To help repel water, the feathers are compact and oily.

In North Carolina the osprey is primarily a coastal species nesting and fishing along our sounds, estuaries and lower stretches of rivers. Individual pairs nest inland and their populations have expanded into many of the new reservoirs in the Piedmont. Fish hawks are most plentiful, however, near the coast. In some areas nearly every channel marker, duck blind and piling is topped by a large stick nest.

We read of the need of old-growth forests for spotted owls and know that even going near a bald eagle nest may cause our national symbol to desert its eggs. The osprey, however, seems unconcerned with the presence of humans or our activities. The birds are not alarmed by the constant passage of boats when they nest on channel markers. They nest on the chimneys of condominiums in Manteo, and there are even records of them nesting in a busy amusement park.

The difference between ospreys and these other birds is that with a relatively limited number of sites capable of supporting their bulky nests, ospreys must go where they can find a suitable structure. Nests weigh hundreds of pounds so the birds can't just put them anywhere. Birds selecting sites near constant human activity become conditioned to it. Birds nesting in wilderness areas, however, continue to be alarmed by the approach of humans and may even permanently desert their nests if disturbed. While there is nothing particularly surprising about this conditioning, I wonder why other native raptors cannot make similar adjustments.

The ospreys' tolerance of man is not new. In the early 1950s I recall seeing lines of telephone poles in coastal towns, each pole supporting an osprey nest despite heavy traffic below. The absence of this sight today is not a result of a preference change by the birds; poles were redesigned by utility companies tired of the problems caused by the nests. As recently as the mid-1970s, many administrators had not learned to cope with ospreys. I know of one instance from this time when a nest on a North Carolina channel marker was cleared with dynamite. The agency heads who make decisions like this have since learned to be more sympathetic to the ospreys' needs and have taken the time to redesign structures so that they do not make attractive nest platforms. In some cases, the structure is rearranged so that the nests do not impair the principal purpose.

Because nests of ospreys are so large and substantial, other birds often move in, too. I have seen house sparrows building their grassy nests among the sticks beneath ospreys. Common grackles, house wrens and even night herons have been seen using the base area of osprey nests as tenements. In places where ospreys nest on the tops of duck blinds, biologists have documented black ducks, mallards, barn swallows, barn owls, green-backed herons and other birds all sharing various portions of the same duck blind for nesting. The smaller tenants all receive some degree of indirect protection because ospreys actively defend their nests.

HOWARD COUPLAND

***Osprey nests** are large and need a solid structure to support their weight. This osprey brings a stick to add to its nest. The osprey's feet, adapted to catching fish, are unique among raptors.*

# THE COMPLETE Osprey

Watching the adult ospreys around the nest is a rewarding experience. Because the males can be distinguished from the females, it is informative to see how they divvy-up the chores. The females usually have a darkish band on the upper breast. Pairs bond through aerial displays, vocal exchanges and shared duties in nest construction (or in some cases simply remodelling the old ones). The pair bond is strong and usually continues from season to season as long as both members of the pair survive. Once the eggs are laid, the female remains in close proximity to the nest and handles the majority of the incubation chores: brooding of the young, and the later stages of nest maintenance. The male's role is mostly reduced to that of a fish-delivery service. In the spring the adults seldom return to the nest site on the same day. This not only suggests that they take their winter migrations separately, but that they may bond to the actual nest site as much as they do to each other.

Determining normal survival rates helps biologists to understand long-range population trends. For the osprey, as in most animals, the highest mortality is observed in the first year when about 51 to 57 percent of the ospreys die. After the first year, mortality declines sharply averaging from 16 to 19 percent per year. Based on these figures and other life history information, it has been determined that an average of one young per nest must survive each year to maintain a stable population. With a typical clutch size of three eggs per nest it is clear that with a 50-percent mortality in just the first year there is not a lot of latitude for additional mortality. The stability of the population is in the hands—oops—the talons, of the adults. With life expectancies of up to 25 years, ospreys are able to produce enough young over their lifetime to keep their numbers in balance.

As cool weather approaches, ospreys start their southward migration. By mid-September most of our local ospreys are south of the United States border, migrating through the West Indies and arriving at their South American wintering areas by mid-October. In years of mild winters birds may linger longer and there are often isolated reports of individual birds in our area late into November. By February adult birds have left their wintering areas and most North Carolina birds are at their nesting sites by mid-March. Unlike many hawks, ospreys do not migrate in flocks.

Based on returns from banding studies, biologists have learned that most of the ospreys in the mid-Atlantic states winter in an area stretching from northwestern South America to Panama, but some range as far south as Argentina and Peru. During their first year,

***Unlike many other** raptors, ospreys can usually adapt readily to human presence. They commonly build nests on man-made structures, including channel markers.*

LYNDA RICHARDSON

***Large shallow lakes*** *or bodies of water provide ideal osprey habitat, as this nest overlooking a lake in eastern North Carolina shows. Ospreys young and old feed exclusively on fish.*

young birds stay in the vicinity of their wintering grounds through the summer. Two-year-old birds migrate northward, but most appear to be randomly distributed south of the areas where they were raised. By the time they are three years old, the birds return to their nesting areas. Dispersal into new areas is limited. Nearly all adults return to nest in areas within 65 miles of the nesting sites of their parents, most within 15 miles.

Several decades ago the very survival of ospreys was in question. Due to runoff of pesticides into lakes and bays, large quantities of DDT collected in fishes, which in turn were preyed upon by ospreys. While the pesticide loads were not high enough to kill the ospreys directly they did cause eggshell thinning, high instances of egg breakage and poor reproductive success in ospreys. The story of eggshell thinning is well-known, but the pesticides also induced liver cells to produce microsomal enzymes that degrade sex hormones to the point that they fail to promote normal reproductive behavior.

In many places where ospreys were a common sight in the 1940s, the birds were nearly gone by the 1960s. Regulations that removed from market the persistent pesticides that accumulate in living organisms resulted in a reversal of the osprey's downward population trend. Today ospreys are once again birds with stable populations. With all the gloomy predictions about our environment it seems that one should occasionally take time to rejoice over our successes. It is a sad thought that we have to place animals in jeopardy before we can really start to appreciate them. I like to watch ospreys use their specialized feet on days when the sky is bright and the lakes are especially reflective. Time, water and an osprey are the only required ingredients. ⊡


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KEN TAYLOR

# *Desperately Seeking* Salamanders

If you're looking for love during the month of Valentines, you can surely find it in frigid waters in the dead of night.

written by John Connors © 1994 illustrated by Jim Brown © 1994

It's a cold, wet February evening in Piedmont North Carolina. Not cold enough to freeze the rain, mind you, but cold enough to numb one's nose. Time to add a quilt to the bed and wool socks to one's feet. Time to retreat to the warmth and comfort of sleep.

Yet instead of falling blissfully asleep, I lie awake thinking of—don't laugh!—spotted salamanders. It's their first night of courtship, and I'll be here well past midnight contemplating that secret knowledge. I imagine I hear them stirring, digging upward through the muck like zombies on some unspeak-

able quest. They have lived underground for 11 months, but tonight they are moving in great numbers, flowing like the rainwater toward their ancestral breeding pools. I can feel their cold bodies slithering over the slick, wet ground.

I haven't always had this strange connection to spotted salamanders. I used to enjoy my long midwinter slumbers just as much as anyone else. That was before "the experience."

It was March 1981, and I was working as a naturalist in Raleigh when I happened upon the season's first garter snake. I had startled it while it was basking, but it escaped my grasp and slipped beneath a log. I straddled the log and flipped it over, but instead of the snake I beheld an unexpected prize—an adult spotted salamander.

At 7 inches in length, it was impressive. Its uniformly black skin had a deep bluish tinge and boasted two rows of round spots in bold primrose and yellow running the entire length of its body. As I reached for the salamander, my original quarry, the snake, nipped me on the thumb. Startled, I withdrew my hand, giving the snake the chance to slip off. The salamander, meanwhile, disappeared into its burrow. I was left with a vivid, if slightly painful, memory and a newfound interest in this beautiful amphibian.

My next encounter with spotted salamanders occurred two years later, in the winter of 1983, when I enrolled in an "Amphibian Alert" program at the N.C. Museum of Natural Sciences. This is an at-a-moment's-notice program designed to mix amphibians with amphibian lovers when conditions are right for viewing amphibian courtship and breeding. I thought it would be a great way to discover more about amphibians in general, and the spotted salamander in particular. But I didn't read the fine print before signing up. In retrospect, I'm sure it must have said something about rainy and cold February nights, but I paid it no mind.

One night, in the middle of dinner, I received a phone call from Jesse Perry, a naturalist at the Museum who had developed the Amphibian Alert program. "John, this is an Amphibian Alert!" Jesse said excitedly.

I looked at my watch and cocked my ear at the heavy drumbeat of rain outside. "Jesse, I know I signed up for it, and I appreciate your call, but have you looked outside?" I stammered. "It's cold. It's raining cats and dogs out there."

"Right. And that's just when the spotteds like to move. You don't get a chance like this every night. Be at the museum's parking lot in 30 minutes. A bus will take us to the breeding pools."

I was at the museum a half hour later along with 15 other brave souls clad in woolens, waders and raingear and bearing flashlights, buckets, dip nets and wan smiles. If the salamanders didn't show on this godforsaken night, who could blame them?

Spotted salamanders (*Ambystoma maculatum*) belong to a group of salamander species known collectively as mole salamanders. As the name suggests, the spotted and most of its cousins spend the majority of their adult lives in burrows and tunnels. No one is quite sure what they do down there but when kept in captivity they do quite nicely when fed a diet of worms, crickets and other insects. It is known that for each of the five *Ambystoma* species in North Carolina, there is a time of year when some combination of environmental stimuli beckons the adults to rise up above ground to migrate en masse to their ancestral breeding grounds. Each species has its own short egg-laying period, but almost all *Ambystomas* deposit most of their eggs during the rather bleak and cold months from November through February.

One common link among all *Ambystoma* breeding sites is that they are usually fishless and salamander larvae can develop without having to contend with these hungry predators. The sites are temporary or ephemeral rain-collected wetlands. Often they are oxbows or backwater sloughs where a stream or a river has changed course. Sometimes they are created accidentally by a farmer, a beaver or a roadway blocking a natural drainage or streamflow. Whatever their origins, they fill with the rains of winter and spring and dry with the heat of summer. But if the water disappears too quickly because of a dry spring or a hot summer, an entire season of salamander offspring can be lost. Still, adults live for more than a decade and will return to try again the next breeding season.

We arrived at "Martof's Pond" in eastern Wake County shortly before 9 p.m. A film of ice covered much of the small pond. Mercifully the downpour had tapered off and wisps of steam now rose from the icy surface. Occasionally a deafening chorus of spring peepers filled the night air, interrupting Jesse's instructions. "Be careful, be gentle," he concluded, and moments later we found ourselves waist-deep in the water, flashlights and nets in hand searching for the spotted salamanders.

As the frigid water trickled over the tops of my waders I wondered how it was possible for a cold-blooded creature like a salamander to pursue hot-blooded romance in such frigid environs.

But there they were, mostly male spotteds prowling through the murky water, stiff legged, lashing their tails and twisting their bodies as if in slow motion. Jesse had told us that they were depositing sperm packets into the water and exuding a sexual attractant that was apparently irresistible to the females. I could see males and females here and there rubbing and nuzzling in amphibian loveplay. More females would arrive with the next warm rain.

Time passed and finally it was time to go. And not a minute too soon. I was shivering with cold, and wet, too. It was time to retreat to the warmth and comfort of home, and to be quite honest, I've yet to repeat my winter encounter with the mating spotted salamanders.

But about six weeks later, I returned to Martof's Pond, this time on a warm April morning. The results of that February night's amorous undertakings were in evidence everywhere. Dozens of filmy white, gelatinous egg masses were attached to twigs, each swollen to the size of a fist and bearing dozens of eggs, although most, it seemed, had hatched by now. The larvae were swarming about looking like miniatures of their parents except that the spots were absent and they were equipped with gills. The larvae are described as voracious feeders on small aquatic animals ranging from copepods and daphnia to mosquito and other insect larvae and tadpoles. And if those foods ever run short, they eat each other. Of course predators such as dragonfly nymphs and raccoons feed on them, too, so that few young actually survive to leave the pools as transformed juveniles in June.

It was several years later before I encountered another spotted salamander in the wild. While walking bird survey transects across a proposed housing subdivision in north Raleigh, I was greeted by the sound of a spring peeper chorus rising from a pine-wooded knoll not far away. Knowing that this meant there would be standing water, I made my way to the hill top. An abandoned farm road had clogged a drainage ditch for many years, creating an ideal 1/10-acre pool for amphibians. There were hundreds of spotted salamander egg masses!

Good news and yet bad news. For the site would soon be gone, gobbled up by the irresistible tide of development that was transforming the Raleigh area in the 1980s. Salamander pools and subdivisions just don't mix. So it goes for the salamanders, and many other amphibians as well. From acid rain and contaminated run-off that pollutes their breeding waters, to the politics of drainage and wetlands regulation, things don't look good for these creatures.

Yet not all was lost on this day. Raleigh's Parks and Recreation department responded by digging a substitute pollywog pool at its neighboring Durant Nature Park and 50 egg masses were moved. Now I'm pleased as a grandpa to report that within two years, hatchlings from that first seeding had matured and produced seven egg masses of their own. In 1992, over 15 egg masses were counted!

So here it is again—me, the rain and a February night. I lie awake in warm mammalian comfort, tucked in with the knowledge and vision of the spotted salamander's courtship secure in my thoughts. And there, secure, it shall remain. For I know that at least in some Wake County woodlands, their movements, their fixed-eyed breeding frenzy, has this night come alive, and has been preserved for sleepless generations hence. ☐

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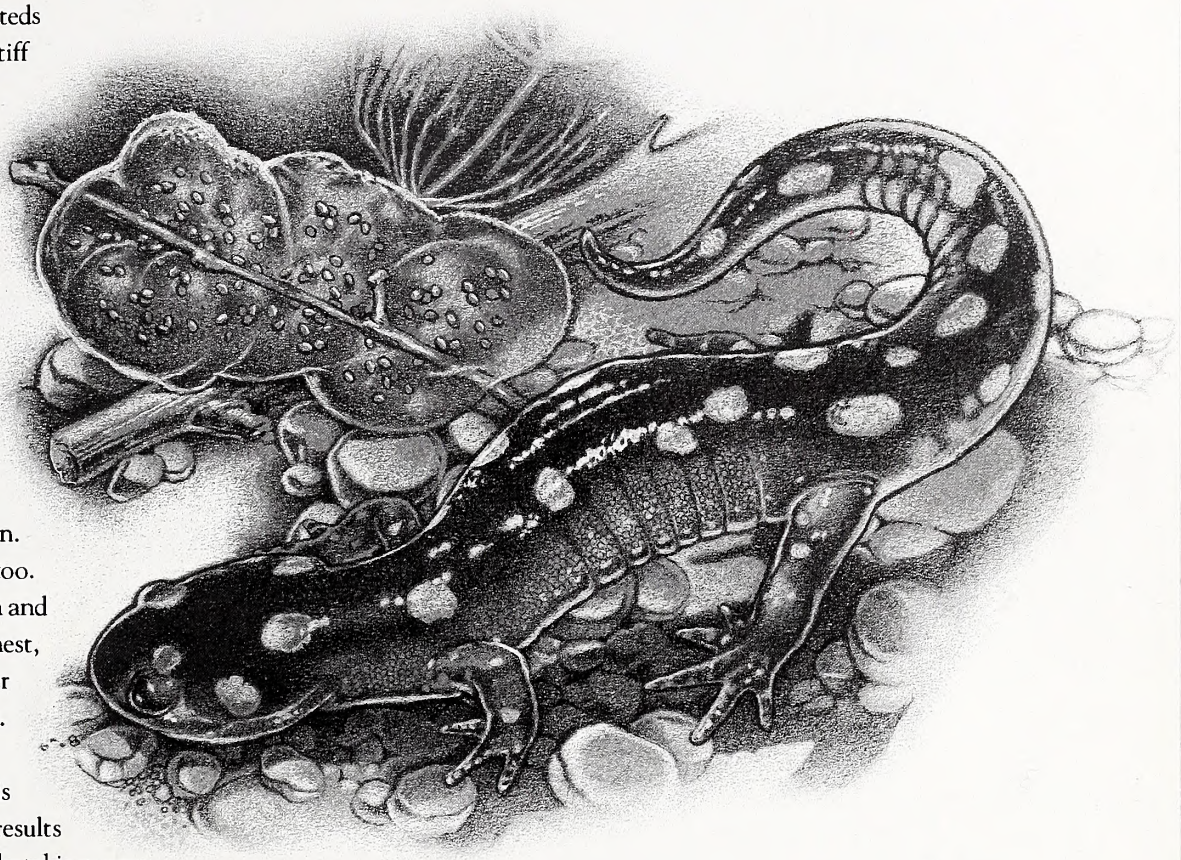
*John Connors has spent 15 years as the naturalist with the Raleigh Parks and Recreation department.*



***After migrating** to their ancestral breeding pods, spotted salamanders mate and lay their eggs in jelly-like masses attached to twigs.*

# ROOM at the TOP

## Summit-time and the living is easy on Mt. LeConte, the fourth highest mountain east of the Mississippi.

written and photographed by
Lisa M. Stroud ©1994

Betrothed Bob Ireton and Linda Dwyer wanted theirs to be a marriage made in heaven. Realizing the geographic difficulties that such a feat could present, the Cincinnati, Ohio, couple made a pre-nuptial pact to settle for the next best thing: hiking 6,593 feet to the top of Mt. LeConte, the fourth-highest peak east of the Mississippi and exchanging wedding vows before their minister and 17 friends in a sunrise ceremony.

"Friends, we are gathered together in the sight of God," began Rev. Gregory L. Inboden, attired in a camouflaged jacket and pants to meet the 36-degree morning. As the blushing bride, dressed in well-worn hiking boots and blue jeans, gazed at the man she had met 18 months earlier on another hiking trip, pink and salmon fingers spread across the clear, April sky as the sun began its ascent above the peak of a neighboring mountain. Morning had officially arrived in the Great Smokies, and Bob and Linda were now husband and wife.

***Sheltering in** the cool of Alum Cave, hikers take a break on their ascent to Mt. LeConte (left). The Alum Cave trail is one of five trails leading to the summit. At the top, hikers socialize near the cabins and dining hall (top, right). Each year, about 10,000 hikers spend the night at rustic LeConte Lodge.*

The Iretons aren't the only ones to plan celebrations atop beautiful Mt. LeConte, which straddles the North Carolina-Tennessee state line. Rufus Morgan, an Episcopal minister from Macon County, N.C., celebrated his 93rd birthday by hiking the mountain. On June 17, vivacious Margaret Stevenson of Maryville, Tenn., hiked to Mt. LeConte, toting her hand-carved dogwood walking stick, to celebrate both her 81st birthday and 600th hike to the top of the mountain.

Each year approximately 10 million people visit the 500,000-acre Great Smoky Mountains National Park, making it the most popular national park in the U.S. But fewer than one in 10, less than 10,000 hikers, make the trek up Mt. LeConte and spend the night at the rustic LeConte Lodge, the highest overnight lodge in the eastern United States. No roads lead to the top, just five trails lined with more than 100 species of trees, 1,300 flowering plants and an abundance of wildlife. With no electricity, no showers and no running water, the lodge is no Holiday Inn. But it provides hand-hewn cabins with quite a view, cabins that are reserved months in advance.

"We are generally booked for the whole year by the end of December," said general manager and part-owner Tim Line. LeConte Lodge, which begins taking reservations for the next season the first of every October, is open from the last weekend of March through the third weekend of November. Thirty-five percent of its visitors are repeat hikers—couples, families, church groups, honeymooners, women's groups, book clubs, nature groups, hiking clubs—who enjoy life at the top so much that they make visiting LeConte an annual event.

The shortest climb is via Alum Cave trail, a 5 ½-mile hike that takes at least four hours.

The other four trails—Boulevard, Rainbow Falls, Trillium Gap and Bullhead—range in distance from 6.7 miles to 8 miles and take from five to six hours from the parking lot at the foot of each trail to LeConte.

For those who put their hiking boots to the shale stone, Mother Nature serves up a diversity of rich rewards. Reflecting the vegetation of the entire Appalachian Trail, a walk to LeConte begins through hardwood forests thick with stands of oaks and hickory and a solid underbrush of rosebay rhododendron, then ascends through an evergreen canopy of moss-covered boulders, ferns, Eastern hemlocks, yellow birch, red spruce and Fraser fir trees, giving the trail a refreshing subalpine scent akin to walking through a lot full of freshly cut Christmas trees.

Along the way, you might catch a glimpse of a chattering Tennessee red boomer squirrel, slightly smaller than its cousin, the gray squirrel; spot a black-bellied salamander; view the aerial acrobatics of a raven; harken to the ever-so-melodious song of the winter wren; listen to the tranquilizing sounds of cool mountain water cascading from a waterfall; spend a few minutes sharing adventures with hikers en route from Georgia to Maine on the Appalachian Trail; perhaps even see a black bear, one of the park's estimated 500 bears. Near the top of the trail, it is common to see white-tailed deer.

***Hikers Nancy Cain** and Margaret Stevenson, left and right, respectively, pause while hiking to Mt. LeConte. Stevenson celebrated her 81st birthday last June by making her 600th ascent to the top of the mountain. Many hikers make annual visits just to sample the splendid views at Cliff Tops.*

But hiking these trails is not without its hazards. Although the trails are well-maintained, hikers must must be careful not to trip over exposed, gnarled tree roots that clutter the pathways or over the many rocks, which are often slippery from woodland moisture. When it rains in the Smokies, as it often does with little notice, the rocky trails, now converted to torrential downhill creek beds, can become extremely difficult to traverse. Because the Smokies average 70 to 90 inches of rain per year, it's easy to be caught in a downpour. It's not unusual to encounter snow and ice in September, nor is it rare even in April. High mountain winds combined with the balsam wooly aphid, a European insect that has been attacking mature Fraser firs in the park for the past 10 years, have toppled many of them, sometimes obstructing the trails. Steep overlooks near the summit, particularly those on the Alum Cave trail, are secured with chain railings to ensure hiking safety.

While LeConte land was still deeded to a lumber company in the 1920s, a nature group from Knoxville, Tenn., began hiking the mountain. It even established a camp there in 1925. Its rugged beauty, they decided, needed to be preserved for others to enjoy, and they lobbied the government in hopes of establishing the Great Smoky Mountains National Park, a dream that became reality in 1934.

Colorful Jack Huff, who logged more than 15,000 miles hiking the mountain, built the first lodge at the top in 1926 and married his wife, Pauline, at nearby Myrtle Point in a sunrise service in April 1934. They remained the innkeepers at LeConte until 1960. One of the favorite stories often repeated about Huff is how he shared his beloved haven with his mother, Martha, who was annoyed that physical impairments would keep her from ever seeing the lodge one vertical mile above Gatlinburg. In 1929, Huff hoisted Martha into a specially built chair, strapped them both to his back and hauled the old lady, comfy in her rocker, seven miles up the side of the mountain.

Lodge ownership passed through the hands of several families until Huff's nephew, Jim, and Ogle Enterprises bought LeConte in 1975. Last year the Huff family once again relinquished ownership when it sold out to Tim Line, a University of Tennessee marketing graduate who renounced the corporate rat race 16 years ago when he first joined the LeConte crew, and his partner, Bill Stokely.

Line and eight other employees operate the three group lodges and seven cabins that can accommodate up to 63 guests. A package deal includes lodging and two meals: breakfast, served promptly at 8 a.m., and dinner, served at 6 p.m.—both family-style. For the past 43 years, their menus haven't varied. Breakfast consists of two pancakes, Tang, scrambled eggs, ham, English muffins, grits and coffee. Dinner includes Swiss minestrone soup, canned beef and gravy, mashed potatoes, green beans, cornbread, half a can of peaches and a cookie. You can even sip a glass of wine with dinner if you order it ahead. The food, far from gourmet fare, is filling and substantial enough to satisfy a lumberjack's palate. "They really could have served dog food," said Claire Czupryna of Apex, who has hiked to LeConte twice, "and you would have eaten it. You're just that tired and hungry."

The folks who work at LeConte, far removed from the ubiquitous Golden Arches, have been known to hike up the mountain with pizzas strapped to their backpacks. For one end-of-the-season celebration, they jokingly ordered egg rolls from a street vendor in Gatlinburg who surprised them by trudging into the lodge late that evening with 100 egg rolls for their party.

Outfitting a mountain inn without easy access to transportation has its own inherent problems. In the early spring of each year, a helicopter, equipped with an 80-foot cable, makes approximately 45 trips to the lodge in two days, hovers above it and lowers nets filled with non-perishables for the season. Three days a week—Mondays, Wednesdays and Fridays—Jim Matthews saddles up his llamas for the 13.5 mile round-trip run on Trillium Gap trail to take clean laundry and perishables to the lodge and haul away the garbage. Seven years ago the LeConte crew began to use a pack of spirited llamas—Horatio, Jacques Cousteau, Coco and Bandy—instead of horses because their two toes and padded feet cause less trail damage than a hiking boot. The animals can also support up to 30 percent of their weight in cargo, and they don't spook as easily as horses.

Animal stories abound at LeConte. Even if you don't wind up hearing a memorable story about a feisty llama, you won't see the sight of blacktop again without hearing a bear story.

One story that Line tells—one he swears is true—is about Sheba, the black bear who successfully bluffed everyone at the lodge. Sheba learned to sit in the middle of the trail, refusing to move until she had intimidated one of the hikers into tossing her some food. And she knew what the sweet ring of the dinner bell meant: it meant that the hikers would soon abandon their cabins for the dining room, leaving her free to break into their rooms and steal their trail mix. She even schemed with

***Beginning in** hardwood forests of oak and hickory, hikers will eventually pass through evergreen forests of red spruce and Fraser fir. Red squirrels, white-tailed deer and black bear are some of the wildlife that can be seen from the trail.*

another bear to pilfer and she timed their plan with precision, so that while one bear amused hikers with her cute antics, the other doubled back around the camp to rummage through the cabins of distracted hikers.

"Black bears, don't attack," Line said. He usually spots the first bear of the season in late April. "They're just panhandlers, looking for something to eat." These days, new anti-bear screens mounted on the cabins discourage the bears from snitching.

Rough-hewn cabins at LeConte include double-wide bunk beds outfitted in thick, Hudson Bay blankets and a kerosene lamp and heater, items necessary for notoriously chilly nights when temperatures dip at least 20 degrees colder than in the valley below. Buckets are issued to guests to hand-pump ice-cold well water from a 6,300-foot-high spring. The main lodge includes artifacts from LeConte's colorful history, as well as an assortment of games and magazines. Most nights find a handful of guests knotted on the lodge's porch or gathered around the potbelly stove, sharing hiking tales, relaxing in rocking chairs or singing along as someone strikes up a tune on the community guitar.

Another favorite pastime at LeConte is viewing the spectacular sunrises and sunsets from the top. After dinner, hikers head up the mountain another half-mile in hopes of catching a dramatic sunset at Cliff Tops. The hard-core, morning people may be heard at dawn the next morning as they stumble from camp toward the rocky one-mile trail in search of sunrise at Myrtle Point.

The cost of spending the night on top of old Smoky: $56.50 per person includes lodging and two meals.

"You mean to tell me you paid good money to tramp up some mountain for four or five hours just to stay in a lodge that doesn't even have a black-and-white TV?" one incredulous flatlander asked a hiker who had recently returned from a trip up LeConte.

The hiker paused. "I paid it once, and I'll probably pay it again next year," he replied. "I was the one who came out on top in this deal."

For more information about hiking to LeConte Lodge, write to Wilderness Lodging, 250 Apple Valley Road, Sevierville, Tenn. 37862, or telephone (615) 429-5704. ☐

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*Lisa M. Stroud is a freelance writer and photographer from Cary, N.C.*

*Fee to Go to Fund*

## Nongame and Endangered Wildlife License Plate Available

*Written and Edited by Vic Venters*

This spring, North Carolina drivers and wildlife enthusiasts will have another means of supporting nongame and endangered wildlife species.

The 1993 N.C. General Assembly passed a law creating license plates bearing the N.C. Wildlife Resources Commission's Nongame and Endangered Wildlife logo. The color logo features a cardinal and dogwood, the North Carolina state bird and tree, respectively.

Regular Nongame and Endangered Wildlife plates will cost $40. Of this amount, $20 is the regular license plate fee, $10 will go to the Nongame and Endangered Wildlife Fund, and $10 will go to the special account for plate production, roadside flower plantings, rest areas and handicapped areas.

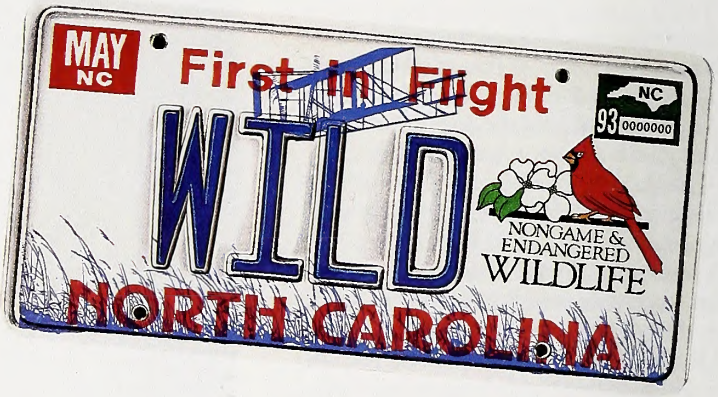
Vanity plates with the Nongame and Endangered Wildlife logo will cost $60, with $10 of the additional $20 going to the state's Recreation and Natural Heritage Trust fund and the remainder to the license plate account. Each year, monies from the Recreation and Natural Heritage Trust Fund are used to buy habitat for gamelands, state parks and other natural areas.

"Monies from the sale of these plates will allow us to maintain and, hopefully, expand our protection efforts for the state's rare and threatened wildlife species," said Randy Wilson, section leader for the Wildlife Commission's Nongame and Endangered Wildlife Section.

In the summer of 1993, the N.C. General Assembly approved a law to allow the nongame logo to appear on license plates. The proposal was introduced by Rep. Billy Richardson (D) of Fayetteville.

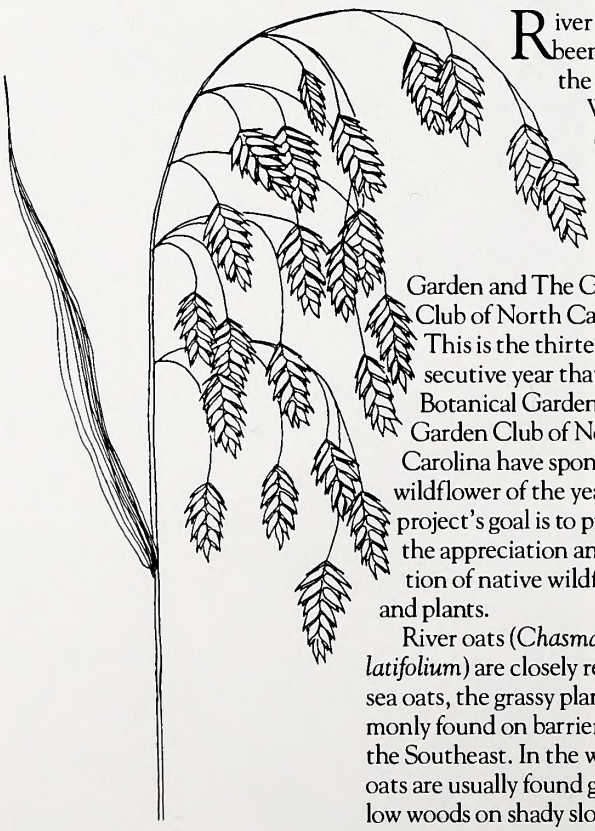
"It's a win-win-win for the state," said Rep. Richardson. "It's a win for nongame and endangered wildlife because it raises funds to support protection programs. It's a win for the people of the state because it is a voluntary tax, allowing those who want to participate to do so. And it's a win because every time someone sees the license plate on the road they will remember the precious beauty of the state and the need to protect its fragile natural resources. That's why I sponsored and pushed hard for its enactment."

The N.C. Division of Motor Vehicles must receive at least 300 applications before the plate can be produced. DMV is currently accepting applications. Individuals interested in applying for the plate should call the Division of Motor Vehicles license plate section at (919) 733-7510. Even if you do not want the plate, you can still contribute to the Nongame Fund. See page 32 for details.




*Send Stamped Envelope for Free Seeds*

## River Oats Chosen as Wildflower of the Year



River Oats have been chosen as the 1994 N.C. Wildflower of the Year (WFOY) by the N.C. Botanical Garden and The Garden Club of North Carolina. This is the thirteenth consecutive year that the N.C. Botanical Garden and The Garden Club of North Carolina have sponsored a wildflower of the year. The project's goal is to promote the appreciation and cultivation of native wildflowers and plants.

River oats (*Chasmanthium latifolium*) are closely related to sea oats, the grassy plant commonly found on barrier islands in the Southeast. In the wild, river oats are usually found growing in low woods on shady slopes along the edges of streams and rivers. The plants are shade-tolerant, making it a useful plant for filling in normally shaded zones in a garden or natural area.

In late summer, river oats develop gracefully arching seed heads that are the signature of this native grass. Planting river oats in groups of three to five creates a full, rounded effect and shows off the seed heads to their best advantage. After late summer, they change from apple green to a rich tawny color, making them attractive additions to dried flower arrangements.

For more information or for a free packet of river oats seeds plus growing instructions, send a self-addressed, business-size, stamped envelope to: 1994 N.C. Wildflower of the Year, N.C. Botanical Garden, Box 3375 Totten Center, Chapel Hill, N.C. 27599-3375.

*—Rob Gardner*
*N.C. Botanical Garden*

*Regulations, Contacts Listed*

## Report Environmental Violations You Encounter

Have you ever discovered silt pouring into a favorite trout stream? Or perhaps a development project whose clearing operations have illegally filled a wetland or damaged a pond, lake or creek. If so, do you know where to report violations?

North Carolina's outdoor enthusiasts can serve as valuable eyes and ears for the environment, and each year citizens report violations that may have gone undetected. Listed below are some of the pertinent phone numbers for reporting environmental violations.

**Animal Wastes**

Animal operations cannot discharge into waters of the state. Discharges can lead to sludge build-up, excessive algae growth in a stream, fecal coliform contamination or a die-off of riparian trees due to ammonia toxicity. If you suspect an animal operation is having an adverse impact on water quality, contact the N.C. Division of Environmental Management at regional EHNR offices.

As of February 1994, new animal operations must be designed, constructed, operated and maintained according to U.S. Soil Conservation Service standards and specifications. To determine if a specific animal operation has been built to appropriate standards, contact your local Soil and Water Conservation District, listed under county government in your local phone book, or call the U.S. Soil Conservation Service, listed under U.S. Government.

Regional offices for the state Department of Environment, Health and Natural Resources include: Asheville, (704) 253-3341; Mooresville, (704) 663-1699; Winston-Salem, (910) 761-2351; Raleigh, (919) 571-4700; Fayetteville, (919) 486-1541; Wilmington, (910) 395-3900; and Washington, (919) 946-6481.

**Discharges and Nonpoint Pollution**

Wastewater treatment plants and industries must have a National Pollutant Discharge Elimination System permit to discharge into waters of the state. NPDES permits include water quality standards for dissolved oxygen, turbidity, biochemical oxygen demand and other criteria that must be met by the discharger. If you suspect a discharger does not have a NPDES permits, or that water quality standards are being violated either by a direct discharger or by a nonpoint source, contact DEM at regional EHNR offices.

**Sedimentation**

It is illegal to violate the turbidity standards designated for waters of the state, whether by a point source or nonpoint source such as agriculture, development or any land-disturbing activity. If you suspect water quality standards for turbidity are being violated, contact DEM, Water Quality Section.

**Sedimentation and Erosion Control Act**

With the exception of agriculture, anyone planning to disturb over 1 acre of land must file an erosion control plan before disturbing the land. Silvicultural practices are also exempt from a permit as long as Best Management Practices are followed.

The Sedimentation and Erosion Control Act is enforced by the N.C. Division of Land Resources, Land Quality Section. You can contact the section by calling a regional EHNR office.

**Wetlands and Waters**

Wetlands and waters of the state cannot be filled or dredged without a 404 permit from the U.S. Army Corps of Engineers and 401 Water Quality Certification from the DEM. Activities such as stream relocation, installation of stream crossings and placement of fill dirt in wetlands by the N.C. Department of Transportation, agricultural operations, private individuals, developers and others must be permitted by the Corps and DEM.

Report suspected violations involving wetlands and waters of the state to the U.S. Army Corps of Engineers. Corps field offices include: Asheville, (704) 271-4855; Wake Forest, (919) 846-1217; Wilmington, (910) 251-4467; and Washington, (919) 975-3123.

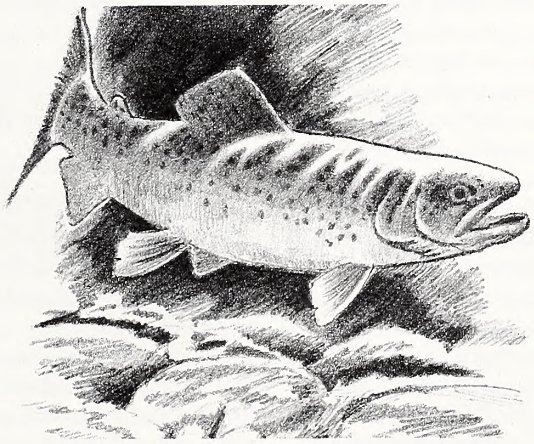
**Wildlife Violations**

Report suspected hunting and fishing violations to the N.C. Wildlife Resources Commission at 1-(800)-662-7137

*—Compiled by Tom Jones*
*N.C. Division of Soil & Water Conservation*

*Drought Didn't Hurt*

## Mountain Trout Streams in Good Shape



Last summer's drought resulted in low waters and marginal water temperatures in some mountain trout streams with small fish kills reported in such popular waters as the Davidson River.

Barring any unforeseen disaster, though, last year's terrible looking stream conditions may have appeared worse than they actually were. N.C. Wildlife Resources Commission fisheries biologists monitoring trout streams have since found that young-of-the-year trout are very abundant in many wild trout streams going into spring.

"In this case, it appears that lack of flooding and low water in streams benefited wild trout reproduction last year," said Jim Borawa, the mountain trout coordinator for the Wildlife Commission's fisheries division. "Low water is just one of many variables that can affect reproduction."

Borawa cautioned anglers against reading too much into the young-of-the-year boom just yet. "We don't yet know whether this reproduction will translate into more fish in a few years," he explained. "Young-of-the-year fish are vulnerable to a host of environmental factors, so it's too early to tell if populations will be larger in a few years."

The fish mortality observed last year on the Davidson was apparently caused by stress when trout were caught and released during periods when water temperatures were higher than normal.

*Four New Streams Proposed*

## Delayed-Harvest Regulations Proving Popular

Delayed-harvest regulations are proving so popular on five selected mountain trout waters that four additional streams have been proposed to be added to the program.

On North Carolina's delayed-harvest regulation waters, all trout caught between March 1 and the first Saturday in June must be released. During that period, only single-hook artificial lures are allowed. Later in the season, the water reverts to normal regulations for stocked streams with normal creel limits and no lure or bait restrictions.

Because the stocked trout are easier to catch than wild trout or stream-bred trout, delayed-harvest waters are ideal training grounds for youngsters or novice fishermen. Catch rates remain high since no fish are being harvested.

Delayed-harvest regulations have been in effect since 1992 on the Nantahala River between the CP&L powerhouse and Whiteoak Creek; Jacob Fork in South Mountains State Park; the Ararat River from SR 1727 downstream to SR1759, Surry County; and the East Prong of the Roaring River in Stone Mountain State Park; and Trout Lake (added 1993) in Ashe County.

Creel surveys conducted over the past two years have determined that 75 percent of anglers fishing the delayed-harvest streams rated their trips as good to excellent. It's estimated that each trout stocked was caught an average of 2 to 3 times. Catch rates for delayed-harvest streams varied between 3.16 trout to 6.54 trout caught per hour.

"While delayed-harvest regulation will not replace traditional put-and-take regulations on hatchery supported streams, their popularity shows that they do meet a need in providing variety in mountain trout angling opportunities," said Jim Borawa, the N.C. Wildlife Resources Commission's mountain trout project leader.

Between March 1 and June 3, delayed-harvest regulations will be in effect on the selected streams and pond. For the remainder of the year, these streams revert to regular hatchery-supported regulations—no bait restrictions, no size limit, seven trout per day creel limit.

The four streams that have been proposed for addition to the 1995 season are portions of the Watauga River in Watauga County; portions of Richland Creek in Haywood County; portions of the Tuckasegee River in Jackson County; and portions of the North Mills River in Henderson County. Following public hearings, the Wildlife Commission will act to approve or disapprove the above streams at their March meeting. If all are approved, delayed-harvest regulations would begin on these four streams in March 1995.

Prior to 1989, North Carolina's hatchery-supported trout-stocking program consisted of only put-and-take stocked streams. The delayed-harvest streams were initiated in 1992 as part of the Wildlife Commission's diversification of trout-angling management options.

*For Roanoke River Population*

## Three-Day Harvest Regs for Stripers

Anglers fishing for striped bass this spring in the Roanoke River management area will encounter new harvest regulations.

While catch-and-release angling will still be allowed each day during the season, harvest will be allowed only three days of each week until harvest quotas are met. Once quotas are reached, all striped bass harvest will be prohibited, though catch-and-release angling will still be allowed.

At *Wildlife in North Carolina's* presstime in late January, harvest fishing days had been set for Wednesdays, Saturdays and Sundays beginning on February 19. Harvest is allowed on Wednesdays from 12:01 a.m. to 12:00 midnight Wednesday. On weekend days, harvest is allowed from 12:01 a.m. Saturday to 12:00 midnight on Sunday.

The three-day harvest regulations are designed to help fisheries managers meet the annual harvest under the official quota allowed in the state's striped bass recovery plan. In the past several years, harvest has exceeded the quota, which is set at 29,400 pounds for the Roanoke River and its inland tributaries.

"Once the stripers get in the river, there is very heavy fishing pressure for them," explained Kent Nelson, the coastal region fisheries research coordinator for the N.C. Wildlife Resources Commission. "The new regulations allow enforcement officers and biologists to more accurately monitor harvest."

North Carolina's current quotas—which also includes 98,000 pounds for the gill net fishery in Albemarle Sound and an additional 29,400 pounds allowed recreational anglers in coastal waters—are based on a 80 percent reduction from average annual harvests made between 1972 and 1979. The reductions are needed to allow a breeding stock to rebuild.

For more information on North Carolina's striped bass management efforts, see the article "Rockfish on the Rebound" in this month's issue.

## Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before travelling to an event. Listings for this calendar should be conservation-oriented and should be sent at least four months in advance.

**March 4-6**

The 14th annual Dixie Deer Classic will be held at the N.C. State Fairgrounds in Raleigh. For more information, contact the Dixie Deer Classic, c/o Wake County Wildlife Club, P.O. Box 99048, Raleigh, N.C. 27624, or call (919) 782-5333.

**March 1-31**

The Mecklenburg County Parks and Recreations Department has formed a new Division of Environmental Education and Conservation. Environmental programs scheduled for this month include: Adult Naturalist series; Eco-Elders senior naturalist series, a butterfly gardening workshop and weekend programs at various county parks. For additional information, please contact Reedy Creek Park, 2900 Rocky River Road, Charlotte, N.C. 28215.

**April 12-17**

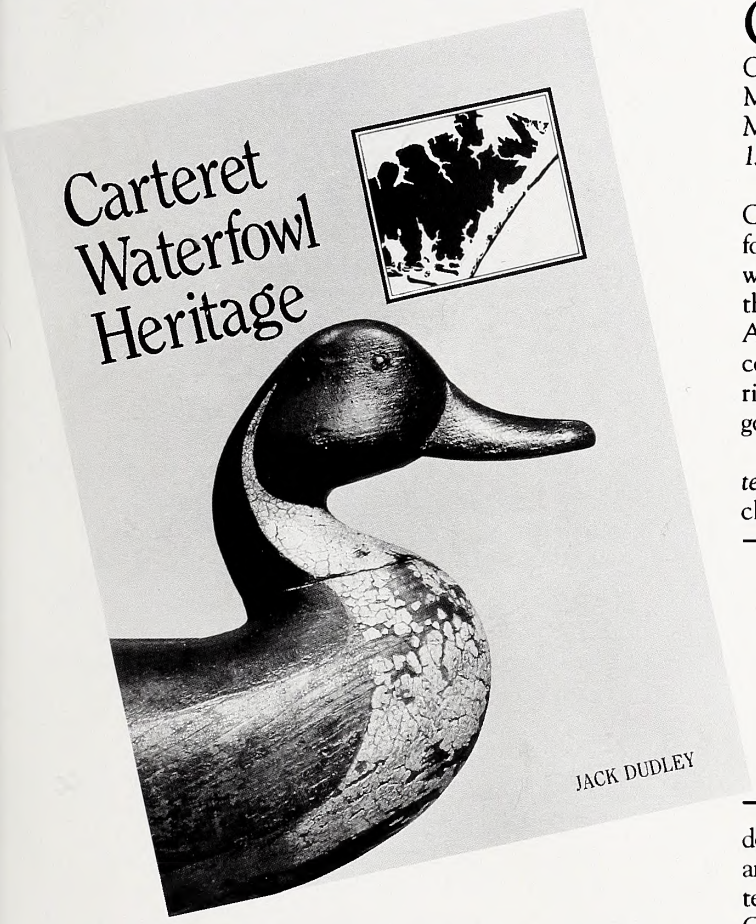
The 24th annual Grifton Shad Festival will feature over 25 events. For more information, contact Grifton Shad Festival, P.O. Box 928, Grifton, N.C. 28530.

**April 23**

The N.C. Coastal Federation will hold its annual meeting at Hammocks Beach State Park. This year's theme will be the "Year of the Coast." Guided field trips, catered seafood lunch provided. Registration required. Contact N.C. Coastal Federation, Hadnot Creek Farm, 3223-4 Hwy. 58, Swansboro, N.C. 28584, or call (919) 393-8185.

*Book Review*

## By Jack Dudley: Carteret Waterfowl Heritage




*Carteret Waterfowl Heritage by Jack Dudley. Published by Coastal Heritage Series and* Decoy Magazine, *409 N. 35th Street, Morehead City, N.C. 28557. 151 p.p., 1993, $40.*

Though North Carolina's Currituck Sound—the "Waterfowl Capital of the World," as it was called—garnered most of the limelight during the Golden Age of waterfowling, other coastal areas share an equally rich, if less known, duck- and goose-hunting history.

Jack Dudley's new book, *Carteret Waterfowl Heritage*, chronicles the lodges, the guides and decoy makers, and the decoys and gunning equipment of Carteret County and surrounding Core and Pamlico sounds.

> *"Waterfowl hunters came from far and wide—both from in-state and from the North—to hunt redheads and divers in Core Sound and brant and Canada geese in Pamlico Sound."*

During the years when baiting and live decoys were legal, more than waterfowl flocked to Carteret County's verdant waters. Waterfowl hunters came from far and wide—both from in-state and from the North—to hunt redheads and divers in Core Sound and brant and Canada geese in Pamlico Sound. Most of the clubs, sadly, are gone today, though a few linger on, victims of declining waterfowl numbers and intensive coastal development.

*Carteret Waterfowl Heritage* was inspired by a similar book, *Gun Clubs and Decoys of Back Bay & Currituck Sound*, written and published in 1991 by Archie Johnson and Bud Coppedge. Like that book, *Carteret Waterfowl Heritage* features a treasure trove of vintage black-and-white photos of hunters, guides and clubs, but also 32 pages of color photos of decoys, guns and duck hunting accouterments.

*Carteret Waterfowl Heritage* is distinguished by its attractive design and layout. The author, a dentist by profession, writes clearly and accurately in an easy-to-read style and has done an impressive job with research. Dudley has produced a book that will be enjoyed not only by decoy collectors and waterfowl hunters, but by anyone interested in Carteret and coastal North Carolina history. In all, a fine effort.

Autographed copies can be ordered directly from the publisher and author. The price per book is $40, plus $2.60 shipping and handling and $2.40 tax for N.C. residents.

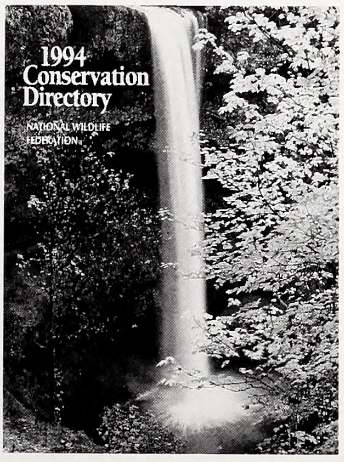
*Lists Conservation Groups*

## 1994 Conservation Directory Available

The 39th edition of the National Wildlife Federation's 1994 Conservation Directory is out. The 504-page directory is the nation's most comprehensive listing of organizations, agencies and officials involved in natural resources use and management.

The directory contains the names of more than 16,000 individuals and over 2,000 organizations in the United States and worldwide. Addresses and phone numbers for federal and state agencies, as well as international, national, regional, statewide and local organizations are listed.

The 1994 Conservation Directory can be purchased for $20 per copy plus $4.85 shipping and handling. For more information, contact the National Wildlife Federation at 1-800-432-6564.



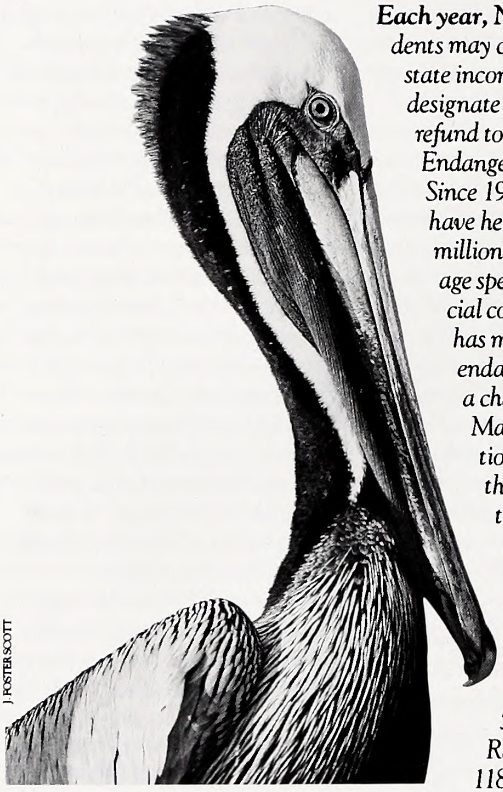

## Field Notes

| | |
|---|---|
| Wild Trout Waters | Year-Round |
| Delayed-Harvest Trout Waters | Opens March 1 |
| Hatchery-Supported Trout Waters | Opens April 2 |
| Wild Turkey (bearded birds only) | April 9- May 7 |

Special regulations apply to some trout waters depending on the body of water. For more information on regulations, bag and creel limits, consult the *1993-94 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* available from license agents or from the N.C. Wildlife Resources Commission, 512 N. Salisbury St. Raleigh, N.C. 27604-1188.

*Contribute Soon*

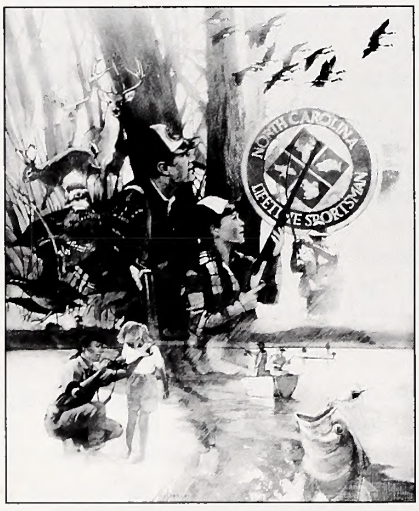
## Tax Checkoff Supports Nongame



J. FOSTER SCOTT

***Each year, North Carolina** residents may check a line on their state income tax refund and designate any or all of their refund to the Nongame and Endangered Wildlife Fund. Since 1983, your donations have helped raise over $3.7 million to protect and manage species that are of special concern. Your support has meant that many endangered species have a chance for survival. Make your contributions directly or through the income tax checkoff to the Nongame and Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.*

## Wildlife Endowment Fund Report

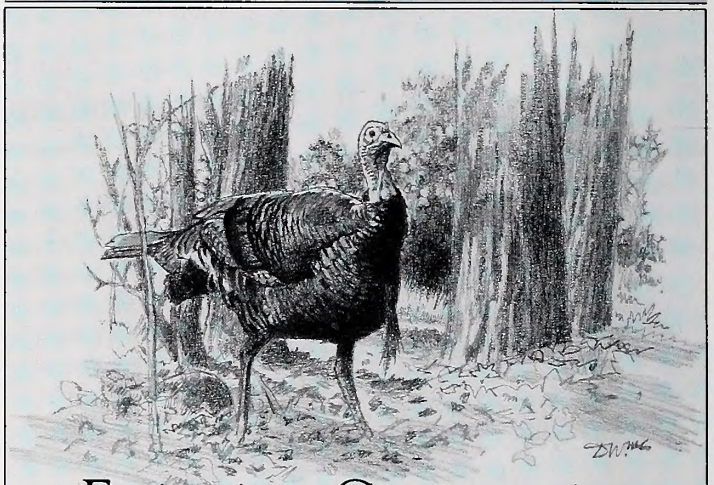



**December 1993**

Principal Balance
$19,142,848.16
Interest Earned
$12,959,242.28
Total Receipts
$32,102,090.44
Interest Used
$5,175,203.48
Fund Balance
$26,926,886.96

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Easing into Conservation

*by Vic Venters*

At current rates, today's estate tax liability assures that many family-owned farms will not be passed on intact to succeeding generations. Many farms end up subdivided with part or all of the farm being sold for development. The result is a loss of not only rural family heritage, but also the permanent destruction of prime wildlife habitat.

If long-term land conservation is a goal, conservation easements are one way families can lower both estate and state and federal income tax burdens. Interested landowners may want to obtain a copy of a new booklet titled *Conservation Easements: An Introduction for North Carolina Landowners*. Written by Camilla Herlevich, an attorney specializing in conservation easement law, the 16-page booklet is a joint project between the N.C. Coastal Land Trust and the Conservation Trust of N.C. It provides a good introduction to what conservation easements are, how and when they are applicable, requirement guidelines and legal advice.

A conservation easement is a written agreement between a landowner and a qualified conservation organization in which the landowner agrees to forego some development rights as part of a charitable donation. In return, there are significant state and federal tax advantages for the donor. The land itself remains in the donor's hands and can be passed on or sold. However, new landowners must also honor the easement agreements and limitations.

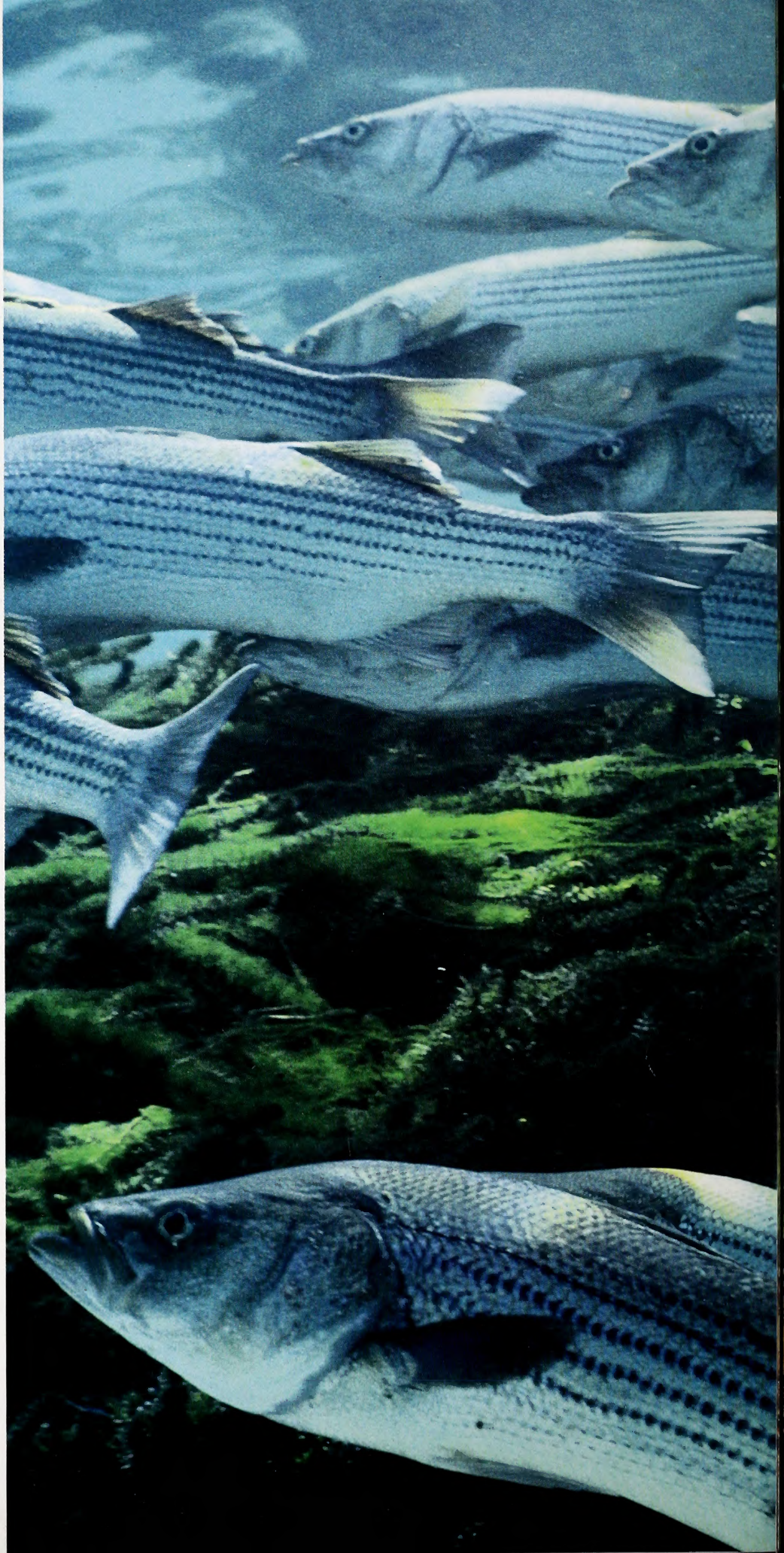
To qualify as a charitable contribution, the easement must be perpetual and serve one of four purposes: preservation of historically important land, preservation of open space, protection of relatively natural habitats for wildlife or plants, or the preservation of land for public use.

The Conservation Trust of North Carolina in Raleigh acts as a clearinghouse for land trusts throughout the state and can help match donors with groups. The *Conservation Easements* booklet is available for $1.50 plus 6 percent N.C. sales tax. Write the Conservation Trust of N.C., P.O. Box 33333, Raleigh, N.C. 27636.

These Birds Are Back!
NORTH CAROLINA
NONGAME &
ENDANGERED
WILDLIFE
FUND
Ospreys have made an impressive comeback in recent years. Your tax deductible contribution to the N.C. Nongame and Endangered Wildlife Fund can help other nongame species. For details, see page 19.
KEN TAYLOR

## School Is In

Each spring, schools of anadromous striped bass ascend coastal rivers to spawn. The Roanoke River at Weldon is a traditional spawning ground, and word that the "rockfish are in" can close local businesses as fishermen head for the river.



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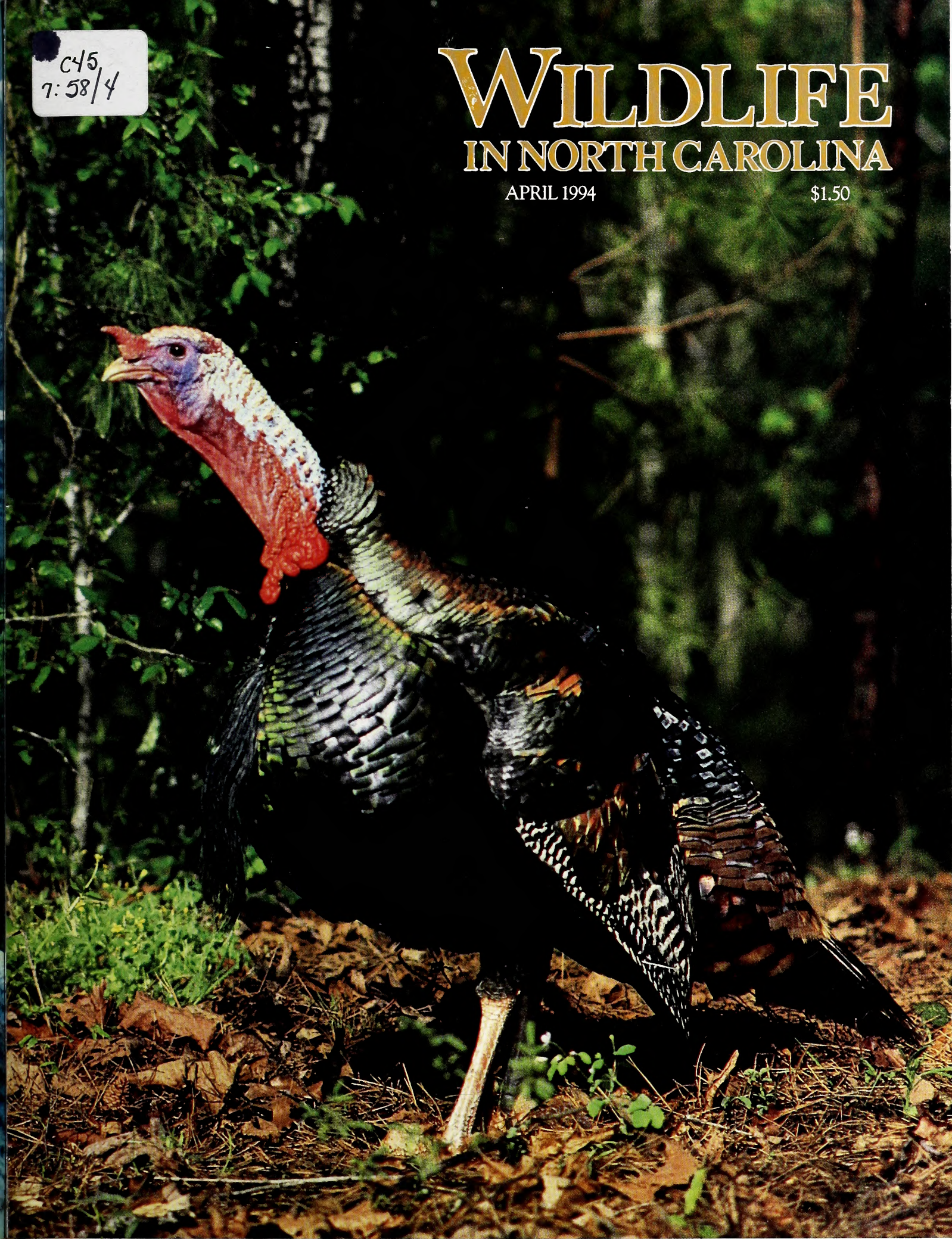
# WILDLIFE IN NORTH CAROLINA

APRIL 1994 $1.50



# Enough Is Not Enough

*by Jim Dean*

What is a reasonable amount of time to spend fishing? I know lots of anglers who manage to get on the water twice a week from spring through autumn and still hold a job, raise a family and keep the lawn below the knees. Even if they never fish at all during half the year, that's still over 50 trips a year. Many avid fishermen, especially retirees, average 100 trips annually, and I have two close friends who go fishing perhaps 150 times a year. Indeed, I have met anglers who claimed they fished somehow, somewhere nearly every day. Some would consider that excessive.

One thing all these people share in common is the belief that they are not fishing as often as they'd like, and most are actively arranging their affairs so that they can increase their time on the water at some point in the future.

I personally think I could make do with 100 fishing trips a year if I were careful not to squander too much of the allotment on low-percentage ventures during the off-season. You see, that's the problem. Obsession does not calculate in advance the number of trips cancelled or impaired due to poor weather, equipment failure, less than optimum water conditions, uncooperative fish, injuries, unavoidable obligational interferences, various acts of God or marriages and funerals (especially your own).

ILLUSTRATION BY JACKIE PITTMAN

If you factor these into the equation—and all fishermen are constantly factoring—then an average of 50 to 100 trips per year falls into more proper perspective. Weeks and months can pass with failure of one kind or another stalking you trip after trip.

I can sense the words that are forming on your lips. Poor baby. Only gets to fish a fourth of his waking hours, and has the audacity to whine about it. Well, yes. I can't whine for every fisherman, but I suspect my experience is somewhat typical. If you love something, and you have high standards, you quickly realize that there is an inverse relationship between effort expended and dream fulfilled. How many holes-in-one can the average golfer anticipate in a lifetime? How many athletes make it to the Olympics, and how many of those win medals? How often, for Heaven sakes, can even a lowly couch potato expect to achieve just the right combination of sofa, junk food and trash TV?

Last year, I calculate that I made quests for hickory shad, white bass/striper hybrids, dolphin, Spanish mackerel, king mackerel and flounder without catching a fish. The shad and hybrids simply didn't appear when they were supposed to. The dolphin inexplicably refused to eat and simply stared at us from the cobalt Gulf Stream. I spent three weekends casting from a pier for Spanish mackerel and had only two strikes. My king rigs haven't felt a strike in years. Had I caught a flounder, it would've been a fluke and, on one occasion, I fed $6 worth of fresh shrimp to seagulls because my bait failed to entice a single sea mullet, spot, croaker or pompano.

Closer to home, last year's warm winter and quixotic spring scrambled the bass and bluegill spawning patterns, and fishing remained erratic well into early summer. With one or two exceptions, the occasionally good big-lake bass fishing enjoyed by some of my friends took place while yours truly was otherwise engaged. A drought sucked many of my favorite ponds into the tobacco fields and crippled four months of late summer and fall mountain trout fishing. In other words, it was a very normal year, fishingwise.

That is not to say, however, that my obsession went entirely without nourishment. There is more to fishing than catching fish. It is often rewarding simply to get outside, and T-shirt philosophers have accurately noted that a poor day fishing is better than a good day working. Furthermore, some trips are salvaged by handsome surroundings, good comraderie or joyous solitude. Others are enriched by a touch of wilderness, a unique encounter with wildlife or fine weather that lifts the spirits. All of these tend to become overrated if no fish whatever are caught.

Yet, the key ingredients often turn on very small matters. Jack Avent and I actually caught quite a few largemouth bass last year, yet simply reducing fish to possession is not enough. More important is the manner of reducing, and we dearly wanted to catch those bass on topwater lures. The bass wouldn't hear of it. Who knows why.

Looking back over the year, I calculate that I had but one truly perfect fishing trip. It took place on a rainy summer day when I caught only one trout, a large, wild brown that I had been trying to catch for over two years. On that gray afternoon, I put months of careful scheming to the test. Two weeks earlier, I had even cut a rhododendron limb that threatened my backcast. I crawled within casting range, made one cast, caught the trout, photographed it and released it. After it swam away, I sat on a rock for an hour in a steady downpour, measuring that transcendent moment against all the many outings that had been merely satisfactory, or less.

One truly memorable fishing trip a year may be enough. But only if you get 100 opportunities.

April, 1994
Volume 58, Number 4

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

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## CONTENTS

4 **Full Circle** *written by Mike Seamster*
*photographed by Lloyd B. Hill* © 1994
*One old-timer recalls the 40-year-struggle to return the wild turkey to abundance in North Carolina.*

8 **Traditional Dry Flies of the Southern Appalachians**
*written by Vic Venters photographed by Ken Taylor*
*The dry flies favored in the South reflect the practical nature of southern trout fishermen, the unique character of our tumbling streams and wild, wary trout.*

14 **Salt & Flies** *written and photographed by Tom Earnhardt* © 1994
*Fly fishermen who make the transition from fresh to salt water will find some big differences—and some big fish.*

20 **Dinosaurs Down the Cape Fear**
*written by David S. Lee* © 1994 *photographed by Melissa McGaw*
*illustrated by David Williams* © 1994
*The fossils of dinosaurs that have been found in North Carolina reveal a fascinating picture of life here millions of years ago in the Cretaceous period.*

26 **1994 Year of the Coast Photo Contest**
*Help celebrate North Carolina's rich coastal environment and unique recreational opportunities by entering your favorite color photograph.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

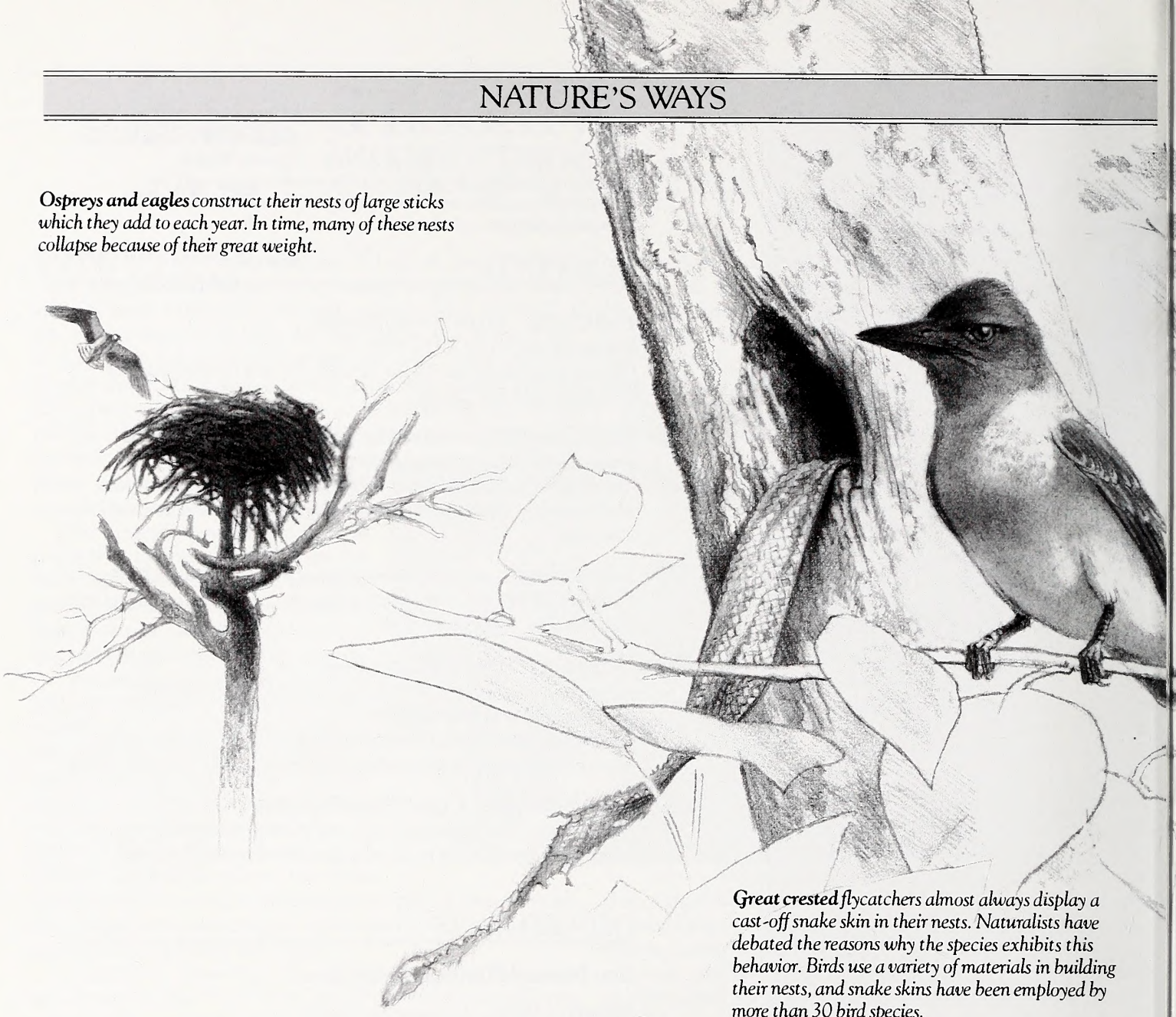
**Nature's Ways** *by Lawrence S. Earley*

**Back of the Book** *by Vic Venters*

**Wildlife Through the Year** *by Vic Venters*

**Cover** *This time of year, gobblers like this one are looking for mates. Photographed by Lloyd B. Hill.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**



***Ospreys and eagles*** *construct their nests of large sticks which they add to each year. In time, many of these nests collapse because of their great weight.*

***Great crested*** *flycatchers almost always display a cast-off snake skin in their nests. Naturalists have debated the reasons why the species exhibits this behavior. Birds use a variety of materials in building their nests, and snake skins have been employed by more than 30 bird species.*

# Snake in the Nest

*written by Lawrence S. Earley*
*illustrated by David Williams*

When great crested flycatchers build their nests, they nearly always employ a cast-off snakeskin as a nesting material. And not just pieces of the skin, as some birds do. Flycatchers prominently display an entire skin, often dangling it out of the tree cavity in which the bird nests.

This behavior has puzzled biologists over the years and it continues to stir some interesting speculations even today. Birds as a group use any number of materials to construct, line and even decorate their nests. Plants of every type are conspicuous in nests, and, as one ornithology text notes, so are "the hair, feathers, skin, shells or skeletal fragments of many animals."

Twigs and sticks seem to be the material that many birds, large and small, choose to give shape to their nests. Herons and egrets build simple stick platforms while ospreys and eagles construct huge piles of sticks that they add to every year.

To soften the insides of their nests for the hatched-out chicks, songbirds often line them with with grasses and other soft plant materials. Robins carry mud into their nests, and rotate their bodies to give it shape. Ducks line their nests with their own feather down while yellow warblers and American goldfinches look for plant down from thistles, willows and poplars. Chicken feathers are another lining material employed on occasion.

Some birds use materials that will camouflage their nests. The parula warbler sometimes builds its nest within festoons of Spanish moss while the ruby-throated hummingbird covers its quarter-size nest with bits of lichen and then knits it together with spider webs. Animal hair and sticky secretions from salivary glands (swifts) are other materials that birds employ to keep their nests from falling apart.

***Ruby-throated** hummingbirds build a tiny nest camouflaged with lichen and knit together with spider webs. The nest is about the size of a quarter and looks like the stub of a limb. Blue gray gnatcatchers and Eastern wood peewees also use lichen to camouflage their nests.*

***Prairie warblers** are one of many species that construct their nests in layers of increasingly softer materials. The outside of the nest is constructed from plant down (a) and pieces of tree bark (b). Inside, grasses and spider silk are used to knit the nest together. Animal hair, grasses and downy feathers (c) line the nest. Feathers are an especially good lining material because they insulate well.*

***Another kind of** camouflaging occurs when parula warblers hide their nests within festoons of Spanish moss hanging from trees.*

Some birds add materials to their nests for no other apparent reason than decoration. Eagle nests in Florida have yielded golf balls, electric light bulbs, fishing lures, a child's dress and even a pair of underwear.

Given such diversity of nesting materials, a snake skin may seem unexceptional. Yet there are differences. Indeed, of the 30 bird species known to use snake skins in the construction of their nests, eight—including the great crested flycatcher and the tufted titmouse—do so habitually. This behavior suggests that the birds are looking specifically for snake skins and are not just picking them up accidentally.

Why? Does the cast-off snakeskin serve a purpose in the nest?

Naturalists once speculated that since snakes prey on many animals, and especially on bird eggs and young, the use of snake skins had evolved as a kind of "scare-snake" to frighten egg-eating raccoons, avian predators and perhaps even snakes themselves. Ornithologists pointed out, however, that this would mean that snakes were afraid of their own skins, which doesn't make a lot of sense. They also wondered why flycatchers wouldn't be equally frightened of the cast-off skin of a snake.

But perhaps the birds don't associate the cast-off skin with snakes at all. As far as the birds are concerned, perhaps they are merely picking up an ornament that's visible from the air. Yet that explanation doesn't seem to explain why great crested flycatchers as a species go to such trouble to search for and locate not just anything bright and attractive, but specifically a snake skin.

David Lee, the state ornithologist at the N.C. Museum of Natural Sciences, offers another way to approach the question. Perhaps the snakeskin serves absolutely no purpose at all, he suggests. "Maybe it was important once upon a time, when the species evolved long ago. Displaying a snakeskin now may be behavior that has ceased to have any usefulness at all."

The lack of consensus on this question may be frustrating, except that it does illustrate an important fact in biological research: many biological puzzles still remain to be solved.

# Full Circle

## One old-timer recalls the 40-year-struggle to return the wild turkey to abundance in North Carolina.

written by Mike Seamster
photographed by Lloyd B. Hill © 1994

A million stars shone brightly overhead as the old man wandered across the backyard puffing on his pipe. The spring gobbler season would open in the morning for the first time in many years in this area. The weather would be crisp and clear—perfect for hearing the big birds gobble.

The old man stopped and sat on the hickory stump at the edge of the backyard to reflect on how his life had been intertwined with that of the wild turkey for more than half a century. His father had taught him to hunt when he was just a boy and had tried to instill in him a respect for the game he sought. He had hunted squirrels, deer, rabbits, quail and whatever other species that would provide a meal for the family. But he had particularly delighted in hunting wild turkeys. Sharp-eyed and keen of hearing, they were a tough challenge. He had killed his first one, a young hen, in the hardwood hollow below the pond on the back side of the farm when he was just a teenager. A flock of 10 or 12 had come scratching up the hollow, feeding on acorns, while he sat waiting out a squirrel by the old den tree. The shot had been an easy one and the bird had provided an excellent meal.

Turkeys were plentiful back then and, over the years, he had developed a reputation as the best turkey hunter in his neck of the woods. His father had died while he was still young and, as the years passed, he had lost touch with the principles he had been taught. When he scattered a flock of young birds in the fall, he took as many as he could—keeping what he needed and giving the rest to neighbors. He chuckled softly as he remembered telling friends that the only seasons he cared about were salt and pepper. Turkeys had gradually disappeared from his area and he had to travel to other areas to hunt the birds. It wasn't until the turkeys were gone that he fully understood how much he cared about the birds. Years later, he realized that he had been a major part of the problem. If only he could have a second chance, he wouldn't take hunting these grand birds for granted.

He relit his pipe as he recalled how the N.C. Wildlife Resources Commission had begun efforts to restore wild turkeys back in the early 1950s. After 20 years of struggling with these efforts, turkey populations were still declining. Drastic steps were needed to reverse this trend. When they recommended closing the fall season and establishing a spring gobbler season in areas that still had birds, the old man fought them as hard as he could. Hunting turkeys during the breeding season would surely wipe out what few birds were left, he thought. It would be too easy to call in the lovesick birds. Besides, turkeys could be no good to eat in the spring.

He had argued these points with a young game biologist at the local country store back in the early 1970s. The biologist had pointed out that the spring season would be set at a time when the hens would already be bred and the gobblers could then be safely harvested. Many of the hens would be nesting and wouldn't be as likely to be shot either accidentally or intentionally. The old man wasn't convinced, but his opposition was to no avail. The fall turkey season was closed and a spring gobbler season was established. He had vowed never to hunt turkeys in the spring. He thought it would be too easy and, besides, it just didn't seem right.

He remembered reading a newspaper article many

*"When they recommended closing the fall season and establishing a spring gobbler season in areas that still had birds, the old man fought them as hard as he could."*

years later about the progress being made with the restoration program. During the decade of the 1970s, the Wildlife Commission had live-trapped and relocated 356 wild turkeys, establishing populations of birds in new areas. Remnant flocks of turkeys had also responded to the new regulations. The tide had turned for the wild turkey. The old man had later admitted to the biologist that the Commission had made the right move. He even decided to give this spring gobbler hunting a try. He had to travel quite a distance to find birds to hunt and he quickly found out that hunting an old gobbler in the spring was no easy task. But the woodsmanship and patience that had made his reputation as a fall turkey hunter so many years ago also made him a successful spring gobbler hunter. He had now taken several spring gobblers, but he longed to see wild turkeys roaming his old home place once again.

*"...the big gobbler seemed to materialize out of a vapor. One second, there was nothing; the next second, he was standing there in full strut, showing his magnificence to the whole world. A shaft of light from the rising sun danced on the gobbler, vividly lighting his iridescence and making the scene before him seem surreal."*

The old man had called the game biologist to try to find out where he could buy some turkeys to release on his farm. He quickly found out that releasing pen-reared turkeys was illegal. He was told that many state wildlife agencies had tried the same thing years ago without success. Pen-reared birds just didn't survive very long in the wild. In fact, this practice could spread diseases to the wild birds. The only feasible way to restore a wild turkey population was with live-trapped wild birds. This time, the old man had listened.

The old man put out his pipe and went back inside. Four o'clock would come early. As he lay in bed, he thought about how excited he had been when he found out the Commission was planning a wild turkey release in his area. That was six years ago. Biologists had evaluated the area and deemed it suitable as a potential restoration site. He had signed a cooperative agreement with the Commission to help protect and manage the big birds. He even helped his neighbors sign up, too.

He had been thrilled when the birds arrived. The biologist had called him and invited him to come along for the release. He even took one of the big gobblers out of the box and set him free. He had cradled the bird in his arms and admired him for a few seconds before releasing him. As he watched the big bird take wing and sail over the tree tops, he was overcome with emotion. A strange feeling had gripped him as he realized he was playing a role in something far more important than he had ever been involved with before.

For six years now, he had watched for the birds. He had seen them in the clover and chufa that he had planted in his back fields. He had avoided mowing during the nesting season for fear of destroying a nest. Three years ago, when he cut some of his timber, he had left the hardwoods on the back side of the farm where the birds scratched for acorns. Local folks knew if one of the birds was shot illegally, the culprit would have to answer to the old man first and to the game warden second. He had done what he could to make this release a success. He had put something back.

***As the old man*** drifted off to sleep, he thought about the role his farm was playing in the big picture. As the years had gone by, the Commission had gradually accelerated its wild turkey restoration program. Like a snowball rolling down a hill, successful restoration projects had provided biologists with additional areas on which to trap, and even more birds had been relocated. During the 1980s, 887 wild turkeys had been released on new sites, including his farm.

More recently, the Commission had begun taking advantage of a relatively new program set up by the National Wild Turkey Federation to acquire wild turkeys from other states to supplement their own trapping. States with surplus birds would furnish them to other states in need of birds for restoration. The states furnishing birds would be reimbursed for their trapping costs, with the money being used for wild turkey habitat improvement, acquisition or research. North Carolina had used the program to further accelerate their wild turkey restoration efforts. Including out-of-state acquisition and in-state trapping efforts, the Commission had released 1,548 wild turkeys to new restoration sites just since 1990. The restoration program was a big success; wild turkeys were flourishing again. He and his farm were a part of that success. The spring gobbler season would open in his area tomorrow morning.

As he made his way down the old farm path in the pre-dawn darkness, frost-covered leaves crunched beneath his feet. There was a nip in the air. He stopped by the pond to await first light. His wrinkled hands lovingly cradled the old double-barreled shotgun that he had carried for so many years. The smell of gun oil filled his nostrils. The younger guys might favor their big magnum guns with their extra full chokes, but he was partial to this gun. It had traveled with him through

many years and through many changes.

As he waited, the woods began to awaken. A shift change was taking place. Night creatures made their way to their dens and day creatures began stirring. The eastern sky turned first a light pink, then a beautiful crimson. Over the chorus of a multitude of songbirds, he heard the first gobble of the morning—the long, deep-throated gobble of a mature wild turkey tom. The big bird was down the hollow below the pond, just at the point of a side ridge. He made his way down to a small flat just above the bird and sat with his back against an ancient oak tree. Over the years it had become his favorite place on the farm. He had a panoramic view of the hardwood bottom below him cloaked in all its spring splendor. The trees were just beginning to put out their first pale green leaves. The dogwoods were dressed with white blossoms and the redbuds were showing just a hint of purple. He could not think of a more beautiful morning or a more beautiful place.

As he waited for full daylight to arrive, his mind drifted to a conversation he had with the biologist just last week. After a 40-year struggle with wild turkey restoration, the end was now in sight. A total of over 3,000 wild turkeys had been relocated to some 200 restoration sites across the state. Within the next three to four years, restoration of the primary wild turkey range in the state would be completed. Population estimates and reported harvest figures reflected the success of the program. From only about 2,000 birds remaining in 1970, the estimate had ballooned to about 40,000 birds now and was still climbing rapidly. Reported harvest figures had soared from only 144 birds in 1977, when mandatory reporting began, to over 2,000 birds in each of the last two years. A string of nine consecutive record harvests had been broken in 1993. The biologist had explained that a poor hatch in 1992 was mainly responsible for the slight decline. Wet weather during the first two weeks after hatching had resulted in poor survival of the poults. However, brood surveys had indicated an excellent hatch in 1993 and the upward trend in both population levels and harvests was expected to resume.

***The old man was*** awakened from his daydreaming by a booming gobble. The woods were much lighter now. It was time for the duel to begin. His first call on the old wingbone elicited a tremendous double gobble. His second call went unanswered. He waited. Patience was a virtue he had learned many years ago. The next sound he heard was wing beats as the big gobbler descended into the hardwood bottom. Once on the ground, the bird gobbled twice more. The old man resisted the urge to call again. He knew the gobbler had him pinpointed. He would continue to wait. Time dragged on. A distant crow called and the bird gobbled again. This time to his left, just over the crest of the flat where he patiently waited. He shifted the old double-barrel to his left and, with his free hand, scratched in the leaves to simulate a feeding hen. He was rewarded with the sound of the gobbler spitting and drumming—very close now, but just out of sight. Then the big gobbler seemed to materialize out of a vapor. One second, there was nothing; the next second, he was standing there in full strut, showing his magnificence to the whole world. A shaft of light from the rising sun danced on the gobbler, vividly lighting his iridescence and making the scene before him seem surreal. When the old man pressed the trigger, he knew his shot was true.

As he made his way to his prize, he noticed the ancient den tree he had been leaning against. It was much bigger now and much more decayed, but he still recognized it. This was the spot where he had killed his first wild turkey over 50 years ago. He sat back down admiring the big gobbler and was filled with a mixture of emotions—elation, remorse, sadness, satisfaction, pride and contentment. Yes, he was elated to have been successful in shooting such a fine bird. But the elation was tempered with a touch of sadness and remorse at having taken the life of such a beautiful creature; they were emotions he couldn't remember feeling as a young man bent on taking as many as he could. At the same time, there was satisfaction and pride. Satisfaction in the knowledge that taking this gobbler would not harm the overall population and pride in the fact that he had helped the wild turkey return. He felt at ease—with himself and with nature. Once, he was a poacher. Now, he was a conservationist. He had come full circle. ⊡

*"After a 40-year struggle with wild turkey restoration, the end was now in sight....From only about 2,000 birds remaining in 1970, the estimate had ballooned to about 40,000 birds now and was still climbing rapidly."*

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*Mike Seamster is the wild turkey project leader for the N.C. Wildlife Resources Commission.*

# TRADITIONAL DRY FLIES *of the* SOUTHERN APPALACHIANS

The dry flies favored in the South reflect the practical nature of southern trout fishermen, the unique character of our tumbling streams and wild, wary trout.

written by Vic Venters
photographed by Ken Taylor

It is serious business, this tying of feather, fur, thread and hook to create the artificial fly. Or at least, fly-fishers take it seriously. In the last 100 years or so, fly-tying theorists have written scores of books on the topic, many delving deeply into the physical and physiological factors that bring trout to the hook—factors such as design, pattern, silhouette, light refraction, surface-film effects, translucence and color.

While there are many different schools of fly tying, they can usually be divided into two larger philosophical camps: imitative fly design and non-imitative design. Imitative flies attempt to do just that: imitate a specific aquatic insect in order to fool a trout feeding selectively (and exclusively) on that insect—hence the term *selective* trout. Non-imitative flies are commonly called "attractors" because they present a general buggy appearance that is attractive (hopefully) to a hungry fish. Some patterns—the Adams, notably—are a little of both. In the last three decades imitative fly design has become *de rigueur* in most fly-fishing regions, especially with the dry-fly purist crowd—those anglers who fish only imitative dry flies to rising trout feeding on the same insects.

It goes without saying that this type of classic dry-fly fishing was *not* perfected in the Southern Appalachians. Even with increasing fishing pressure, our trout are rarely selective—that is, they will rarely key on one type of hatching insect and spurn other food sources. That's because the behavior of a trout is dictated by its environment. In the Southern Appalachians that environment is mountain topography and freestone geology.

Appalachian streams are rarely gentle and they don't babble much; rather, they tumble and fall. Trout water typically begins high in the mountains in tiny headwaters that grow in size as they cascade down from pool to turbulent run to pool. Fast, frothy water is the rule, quiet glides are the exception. Consequently, there's little time in most cases for trout to closely examine an artificial. The region's underlying granitic geology also makes our streams poor in food, at least compared to limestone streams or tail-water rivers. Our streams have neither the sheer numbers of aquatic insects nor the diversity of species. For example, the typical Southern Appalachian freestone stream will support an average of only about 15 to 30 pounds of trout per acre, while some especially rich limestone streams in the Northeast or far West may support several hundred pounds of trout per acre.

A Southern Appalachian trout is, perforce, a hungry trout, eager to rush a morsel as it plunges by. It's either bite or starve—hence, little need for matching the hatch with delicate imitative designs. Our flies reflect this environment. Most of the dry flies you'll drift down a North Carolina stream are attractors: big bushy affairs with thick hackles, palmered bodies, buoyant hair for wings and tails and ample fur bodies. They are designed as much to float our thumping streams as to catch fish. Without the ability to ride whitewater, or at least the cusps of it, a dry fly cannot catch fish. Such flies are, as four-wheel drive tire manufacturers describe their wares, "aggressive" in intent and purpose.

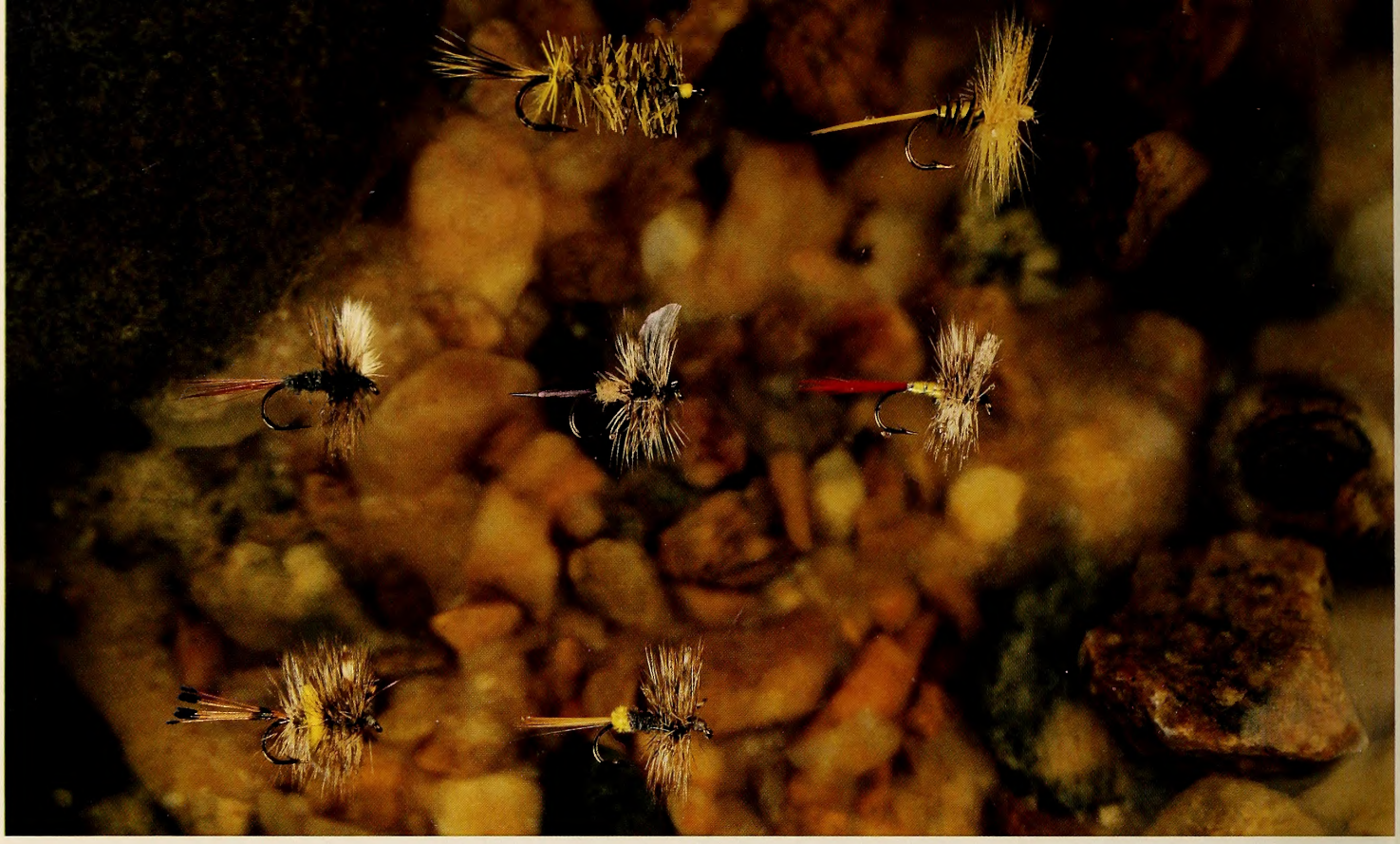
North Carolina is blessed with 4,000 miles of trout streams, many of which have been fished for sport for at least 100 years. What we lack, however, is a literary—and I use that term somewhat loosely—fly-fishing and fly-tying tradition. In fact, it appears conspicuously absent from the Southern Appalachians at large.

The Southern Appalachians have produced no regional version of Halford, Gordon or Marinaro—or any other like-minded theorist—who has applied a sense of systematic inquiry to trout behavior and then refined the techniques and tackle to master them. The absence of which begs a question: are no "Grand Traditions" produced where there are no selective trout? Or are Southern trout fishermen little more than a passel of moonshine-besotted hillbillies incapable of theory beyond outwitting the local revenuer? Or could it be, as one historian and trout fisherman remarked, simply a case of, "We'd rather fish than write about it."

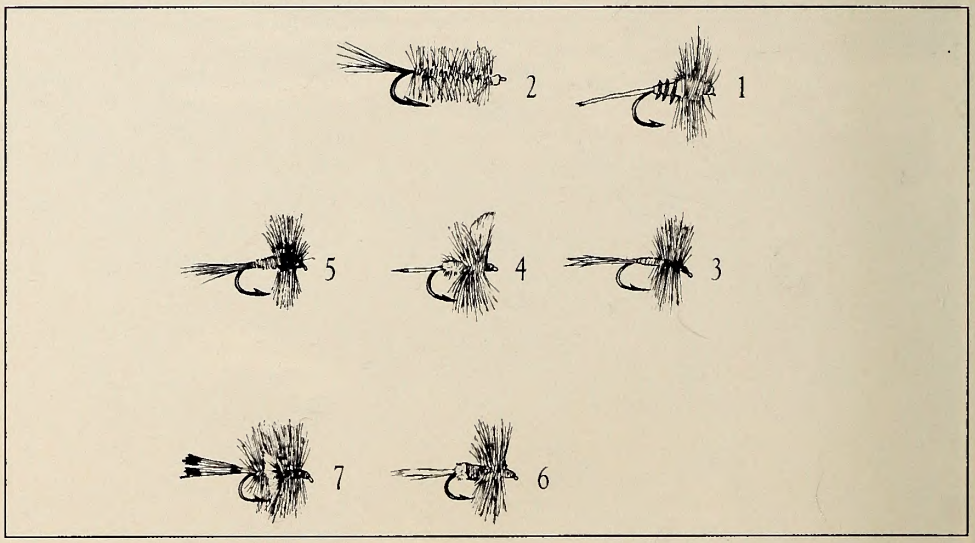
For part of the answer, reflect on the geographic regions from which the great fly fishing innovators have sprung. Frederick Halford had his English chalk streams; Theodore Gordon, the verdant Catskills; and Vince Marinaro, Charlie Fox and others had the fertile limestone streams of Pennsylvania. These and other notables had to contend with rivers with lots of bugs and lots of trout, selective trout at that. And a fair amount

***This photo of** Rev. J.A. Marshall, a "Professor of Piscatorial Art," is believed to have been taken near Cashiers by photographer Henry Scadin in 1895. Marshall is examining what appears to be a "bite" of wet flies, a traditional fly rig where two or more flies are fished in tandem.*

HENRY SCADIN COLLECTION, SOUTHERN HIGHLANDS RESEARCH COLLECTION, UNC-ASHEVILLE



## Some Appalachian Dry Flies




**1 YALLARHAMMER DRY FLY**
The modern dry fly variant of the traditional Yallarhammer. Especially effective in the spring when light-bodied mayflies are hatching. Yallarhammers are also tied as nymphs, winged wet flies and the palmered style also illustrated; it is now illegal to use the yallarhammer or flicker quills.

*Tail:* Light ginger
*Body:* Yellow hammer feather (substitute dyed grizzly hackle, dyed grouse, quail or dove.)
*Wings:* Wood duck flank
*Hackle:* Light ginger

**2 YALLARHAMMER**
The original. Tied on a straight-eyed hook, it can be fished dry, as a nymph, as a wet fly or as a trailer for a spinner. "Before commercial spinners were available, locals used the yallarhammer as a trailer behind a gold willow leaf," says Roger Lowe. Quills were split and soaked in water before tying.

*Tail:* Dyed grizzly yellow
*Body (optional):* Peacock
*Hackle:* Dyed grizzly yellow, clipped

**3 GRAY HACKLE**
One of the oldest and simplest patterns, descended from the popular wet fly of same name. "This was a favorite pattern back when people didn't have many materials," Roger Lowe says.

*Tail:* Red hackle feathers
*Body:* Yellow floss
*Rib:* Silver tinsel
*Wing:* Teal flank
*Hackle:* Grizzly

**4 SMOKY MOUNTAIN FORKTAIL**
The Smoky Mountain Forktail was given national exposure when publicized by Ray Bergman. Tiers report lots of pattern variations in tying it. A fine pattern but a bit fragile.

*Tail:* Gray goose biot
*Body:* Red fox fur
*Hackle:* Mixed grizzly and brown
*Wing:* Gray primary duck wing feather

**5 THUNDERHEAD**
Actually a pattern from the western United States, according to Allene Hall, whose husband, Fred, was often credited with the fly's invention. "Fred was just the first to start tying it around here," she said. The fly is highly effective, though, and still popular in the Smokies. A good floater.

*Tail:* Brown hackle tips
*Body:* Muskrat without guard hairs
*Wings:* White calf tip
*Hackle:* Brown hackle

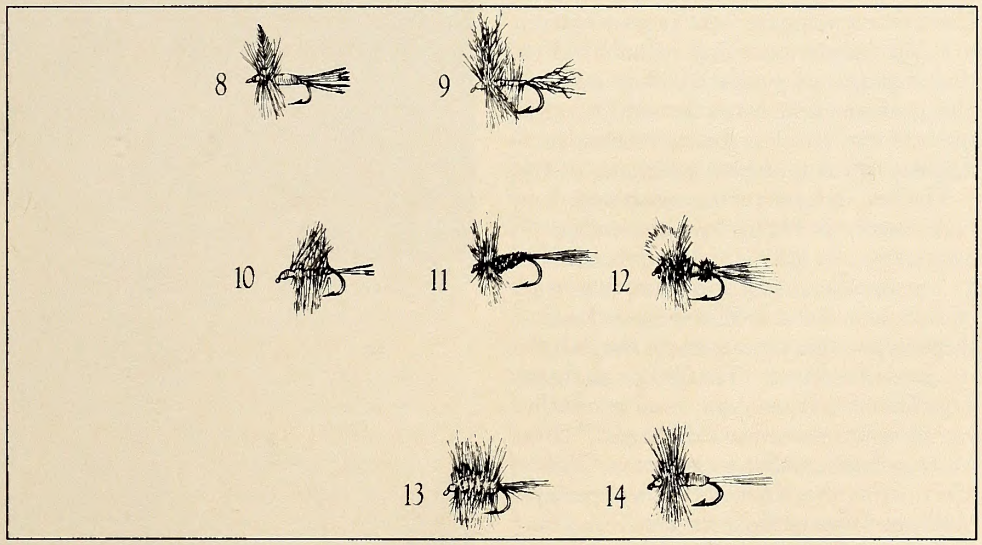
**6 FEMALE ADAMS**
Another national pattern that's become a regional favorite with the addition of the yellow egg sac at the tail.

*Tail:* Brown hackle
*Egg sac:* Fine yellow chenille
*Body:* Muskrat
*Wing:* Grizzly tips
*Hackle:* Brown and grizzly mixed

**7 ADAMS VARIANT**
The only dry fly that tier Fred Hall actually invented, according to his widow, Allene. An Appalachian classic: beautiful, functional and "yallar."

*Tail:* Golden pheasant tippet (or deer hair)
*Rear hackle:* Grizzly
*Midbody:* Yellow ostrich herl
*Wings:* Grizzly hackle tips
*Front hackle:* Grizzly

## ...And A Few More




### 8 Hazel Creek

Named after the famous trout stream in the Great Smoky Mountains National Park. According to Roger Lowe, it's an older pattern with origins on Hazel, Forney and Eagle Creeks.

*Tail:* Golden pheasant
*Body:* Cream fur
*Wing:* White hackle tips
*Hackle:* Brown and grizzly

### 9 Corey's Calf Tail

Corey's Calf Tail is derived from the large night-fishing patterns tied in Michigan on size 2 and 4 hooks. "We've downsized it considerably," says Roger Lowe. "The calf tail wings and palmered body make it a great floater and it fishes well over on Cataloochee and Big creeks."

*Tail:* Calf hair
*Rib:* Brown feather
*Body:* Yellow
*Wing:* Calf tail
*Hackle:* Brown

### 10 Rattler

According to Roger Lowe, this is an old pattern with origins on the Oconaluftee River. Palmered body with trude-style wing.

*Tail:* Golden pheasant
*Body:* Brown and grizzly
*Hackle:* Brown and grizzly
*Wing:* Calf tail

### 11 Early Nelson

Often attributed to the late Cap Weise, another local fly-tying innovator. "The peacock body makes it a great attractor," says Don Howell, "Most anything with peacock is."

*Tail:* Black bear hair
*Body:* Peacock
*Wing:* Grizzly hackle tips
*Hackle:* Brown and grizzly mixed

### 12 Tennessee Wulff

Wulffs have been among the most popular dry flies in North Carolina, particularly the Royal Wulff. The Tennessee Wulff is a Royal Wulff with chartreuse instead of red floss, reflecting a regional preference. It's becoming more and more popular.

*Tail:* Dark deer hair
*Body:* Peacock herl and chartreuse floss
*Wing:* White calf tail
*Hackle:* Dark brown hackle

### 13 Yellow Palmer

The yellow palmer is popular in park waters, especially on Cataloochee Creek. Combines two requisites—"yallar" and good flotation. A bivisible style fly.

*Tail:* Brown and grizzly hackle
*Body:* Medium yellow fur
*Hackle:* Brown and grizzly
*Thread:* Yellow

### 14 Yellow May

A general pattern, though tied to imitate the yellow mayflies that come off in May.

*Tail:* Light ginger hackle fibers
*Body:* Light yellow spun fur
*Wing:* Wood duck flank
*Hackle:* Light ginger

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*Flies numbered 1, 4, 5, 6, 11, 12 and 14 were tied by Don R. Howell of Dwight and Don's Custom Tackle, Brevard. Flies numbered 2, 3, 7, 8, 9, 10 and 13 were tied by Roger Lowe, Lowe Fly Shop and Outfitters, Waynesville.*

of fishing pressure to boot. Selective trout demanded fly-tying innovation if they were to be creeled.

But there's more to this fish story than fish. The western states, after all, have a tremendous trout resource—grander, really, than anything back East—but it's only been in the last half century that fly fishers out West have been leaving a paper trail detailing their fly-design innovations. Like the West, the Southern Appalachians have few metropolitan areas—the urban concentrations of wealth, education and leisure that encourage and foster the esoterica of fly fishing. Appalachia, too, was relatively isolated until modern highways began carving mountain seclusion away, bringing prosperity to the hills. These socioeconomic factors, along with a lack of selective trout, have certainly conspired against the formation of a literary Southern Appalachian fly-tying tradition.

The lack of books and nationally famous names shouldn't be interpreted as a lack of regional trout-fishing tradition, however. It's a widespread conception that local mountain anglers were, until recent times, strictly subsistence bait fishermen, while fly fishing was an elitist introduction from wealthy sports. Like most stereotypes, there's a grain of truth to it, but there are enough accounts of old-time angling to prove that fly fishers were plying mountain waters in the mid-19th century and were an integral part of the early Appalachian trout-fishing tradition.

The first fly fishers of the region were undoubtedly the Native American indigenous peoples. In 1888, Charles Orvis described a Cherokee fly as being made from thin strips of short-haired deer hide, reverse-tied with the hairs pointing toward the eye instead of the bend of the hook. "The Indians tie them to perfection and use some sort of cement or varnish making waterproof the thread," Orvis wrote in *Forest and Stream* magazine. "The effect of this reversed method is very perceptible in swift water. Every little move in drawing back as it floats down gives the appearance of a live worm trying to get out of the water."

We'll never know who the first Europeans were to fly fish the mountain streams, but the first to write about it was Charles Lanman in the 1840s, at the time one of the best-known traveling fly fishermen of his day. In an excellent article, "Of Specks and Yallarhammers: North Carolina's Rich Trout Fishing History," published in the summer/fall 1989 issue of the *FLYline*, Jan Davidson chronicle the roots of North Carolina's recreational trout fishing.

Davidson, now executive director of the John C. Campbell Folk School in Brasstown, writes that Charles Lanman encountered "gentleman anglers" in his 1840s trip through the region. And by 1885, a fishing guidebook written by Charles Harris stated that "artificial fly is the universal lure favored by the native fishermen in this section." This certainly gives the lie to the theory that artificial flies are a recent innovation in this region.

In the late 19th century, the standard method for fly fishing involved fishing wet flies downstream, often on a "bite" or "cast"—a rig of two or more flies trailing each other. Fished downstream, the gaudy flies proved deadly against native brook trout. Although classic dry-fly theory was becoming formalized by Frederick Halford's 1880 English treatises, at least 30 years passed before dry-fly fishing became widely adopted in the United States. Even in a fly-fishing hotbed like New York, as late as 1911, it was reported that there were not more than 100 real dry-fly fishermen in the United States.

Downstream wet-fly tactics using simple tackle—often cane poles—remained popular in the Appalachians well into the 1920s, even after the arrival of warier rainbow and brown trout in the late 19th century. Some of the most popular wet-fly patterns used in the Smokies were, according to Robert L. Mason's colorful 1925 book, *The Lure of the Great Smokies*, in order of preference: the Brown Hackle, Royal Coachman, Cahill, Cowdung, Black Gnat, Queen of the Waters, March Brown, Montreal and the Grizzly King.

It's interesting to note that these were all

***Noted fly fisherman*** *Mark Cathey of the Bryson City area looks ready to head for the hills with his rod, hound and shotgun. Cathey's modified dapping technique—the "dance of the fly"—was legendary in the Smokies.*

MOUNTAIN HERITAGE CENTER

national patterns, not local Great Smoky Mountain patterns. But sometime during the late 19th and early 20th centuries, anglers near the Smokies developed what is probably the most famous Southern Appalachian fly pattern, the Yallarhammer.

The Yallarhammer began as a wet fly tied from the feather of the "Yallarhammer," the (now protected) common flicker. Today, there are four versions of the fly—a dry, a nymph, a wet fly and a simple palmered pattern tied on a long, straight-eyed hook. Davidson speculates that the Yallarhammer may have had its origins with the indigenous people of the area. "Probably it was the Cherokees who first brought down a yellow-shafted flicker with a blowgun, and wrapped its bright quill around a hook and caught trout," Davidson writes. "Maybe they tied the fly like they tied the deerhair fly, reverse-palmer style. Wet flies with swept-back wings, dry flies and nymph styles came later."

Another favorite early local pattern was the Tellico, still a popular (and very effective) nymph pattern. Unlike the regionally used Yallarhammer, the Tellico nymph may be the region's fly candidate for wider celebration. Tellicos are popular nationwide and catch fish on a variety of rivers. Like the Adams, the Tellico is an attractor pattern that also imitates some specific insects, probably various yellow stonefly species.

According to Jim Casada, a historian and noted writer on Southern Appalachian fly fishing traditions, dry-fly tactics began to catch on in the region in the 1930s. A precursor of modern dry-fly tactics was angler Mark Cathey of the Bryson City area who fished the Smokies from the 1890s to the 1940s. Cathey's "dance of the fly" is often heralded as one of region's earliest dry-fly tactics and the man was undoubtedly a master angler.

Most likely Cathey did not actually invent this practice, but refined an old wet-fly technique already in use here and elsewhere. Using several flies on a leader, the trailing fly or flies were fished downstream wet or in the surface film, while the top fly would often dance on the surface.

Cathey's technique was slightly different but deadly. "He held out his rod and tossed the fly (upstream) into the pocket," Jim Gasque wrote of Cathey's style in *Hunting and Fishing in the Great Smokies*. "The instant it touched, he had it turning from one side to the other, dancing across the pocket like a struggling fly trying to rise from the surface. Now and then it would rise and inch or two from the surface, only to fall back with more skitter and dance. The fly gave the perfect impression of an insect desperately trying to take off, but never being able, seemingly, to do so." Jan Davidson writes that his presentation was so effective that Cathey reputedly remarked, "I've been accused of being the best fisherman in the Smokies."

The importance of presentation, rather than fly design, was echoed by other early trout anglers. "Makes no difference about the kind of fly," said Matt Whittle in the 1920s, described in Robert Mason's book as an "Izaak Walton" of Great Smoky Mountain fishermen. "I've seen these mountain boys catch big ones with a bare hook practically, with every vestige of fly gone apparently: the more ragged the better. The manipulation has much to do with success."

Today "manipulation" is called "presentation," and most Appalachian experts agree that proper presentation and approach have much more to do with fishing success than the choice of fly. Presentation means fishing the fly so that it acts naturally, and approach means making sure the angler is not seen, heard or felt. If not selective, mountain trout are exceedingly wary. Their homes and sanctuaries are small, shallow and limited, hence their reflexes must be fast. The water snake, the kingfisher and the raccoon are real threats, and at the detection of anything unnatural, mountain trout spook first and ask questions later. A dragging dry fly, consequently, is often enough to put a trout off its feed and the sight or sound of an angler will scoot trout under a rock, certainly for several hours and perhaps for the rest of the day.

As dry-fly fishing became more popular in the 1930s and 1940s, local fly patterns begin to crop up. Just who tied a particular pattern first is poorly documented, to say the least, so definitive origins of local patterns are impossible to find. And I'm not brave enough to guess.

But one shouldn't discount the innovations of regional tiers just because there aren't a lot of books on the subject. The Bryson City area, in particular, has a strong tradition of local fly fishing innovators, Mark Cathey and Sam Hunnicutt were famous in their day, and Frank Young, also of Bryson City, is well known for substituting possum hair for kip tail or deer hair in his flies. The late Cap Weise of Patterson is also widely recognized as an innovative fly tier. Perhaps best known was Fred Hall, who, along with his wife, Allene, tied flies professionally from just after World War II until his death in the early 1980s. More recently, professionals like Don Ray Howell, and his late brother Dwight, of Brevard, and Roger Lowe in Haywood County are continuing the regional fly-tying traditions today.

If exact hatch matching isn't usually critical, what makes a good Appalachian dry fly? "I steadfastly maintain that visibility and flotation are the two most important characteristics for a good Southern Appalachian fly," says Jim Casada. "These two are much more important than color or specific pattern."

Still, the color yellow—"yallar"—has long been popular in the homegrown flies of the Southern Appalachians, the aforementioned Tellico and Yallarhammer being prime examples. Mark Cathey's fly of choice was apparently a yellow-bodied Gray Hackle in sizes 10 to 12. Fred Hall's Adams Variant features a yellow mid-body and the popular Female Adams, a yellow egg sac. And the region's most popular bait? Corn.

Most dry-fly patterns popular in the mountains today are variations on national designs—the various hair-wing Wulffs, elk hair caddis, bivisibles, fore-and-aft flies, and deerhair-bodied flies like the Humpy and the Goofus Bug.

To my mind, Fred Hall's Adams Variant is an archetypical Southern Appalachian dry fly. Like most regional patterns, it is a variant of a popular and highly effective national attractor pattern. Hall regionalized it by adding a thicker hackle, attached the ubiquitous "yallar" mid-body for visibility, and finished up by tying in a smaller aft hackle to aid flotation. It's a beautiful fly still popular in the southwestern North Carolina mountains today.

Despite increasing fishing pressure in the last two decades, most experts agree that presentation, rather than pattern, is still the key to success on freestone streams. This isn't to say that fly selection can't be important, particularly during hatches on hard-fished catch-and-release waters like the Davidson River. Flies that approximate the color and size of hatching insects can be more effective than those that don't. And, it's fair to say, mountain anglers will occasionally encounter selective trout, where exacting imitation is important. "I believe terrestrial imitations will become more important," adds tier Roger Lowe. "This will be particularly true if air pollution—acid rain—reduces the diversity of natural aquatic insects."

North Carolina has a rich tradition of fly fishing, in its own right, even if it's one that hasn't been terribly influential beyond a regional scale. For many fly fishermen who spend as much time reading about fishing as wetting a line, the dearth of literature can be a little frustrating. But mountain trout pay little heed—they don't read, after all. ⊡

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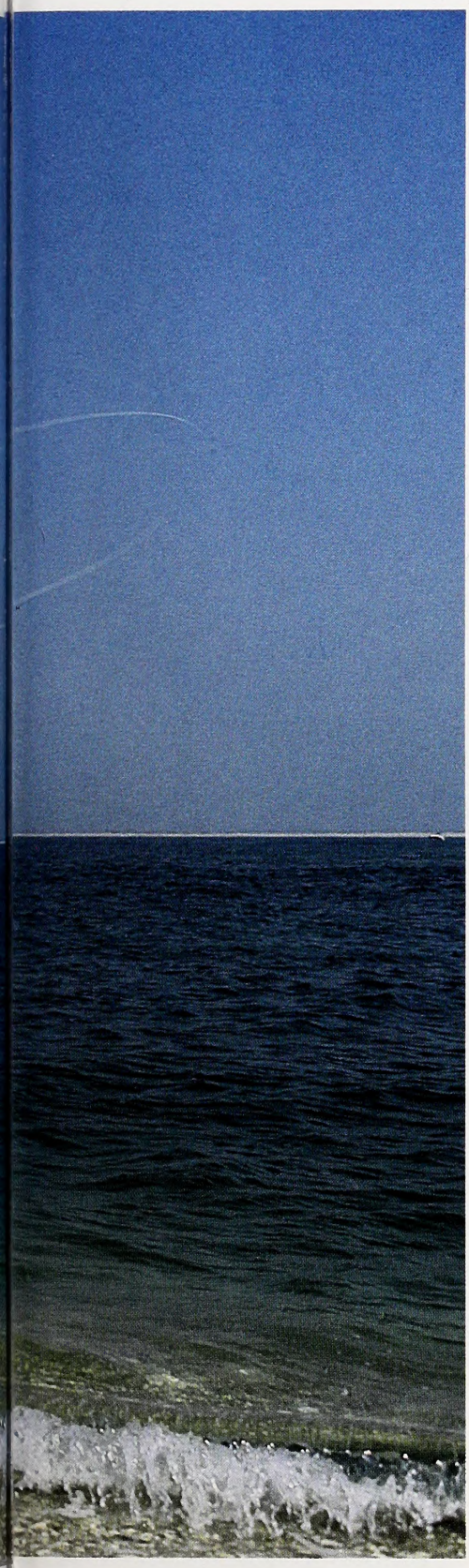
*Published sources consulted for this article include* American Fly Fishing *by Paul Schullery;* The Lure of the Great Smokies *by Robert L. Mason; "Of Specks and Yallarhammers" by Jan Davidson in* The FLYline, *issue II, vol. II; and "Fred Hall: Master Fly Tying Specialist of the Smokies" by Robert S. Eldridge in the* N.C. Outdoorsman, *April 1988. Jan Davidson located the vintage photos, and Jim Casada gave the author generous help.*



**Anglers taking** *part in a salt-water fly-fishing class test their skills at casting tight loops in the surf along North Carolina's coast. The popularity of fly fishing for a wide variety of salt-water gamefish has grown rapidly in recent years.*

# Salt & Flies

## Fly fishermen who make the transition from fresh to salt water will find some big differences—and some big fish.

written and photographed by Tom Earnhardt ©1994

Have you noticed anything different about your favorite tackle shop in recent years? Stores from Asheville to Morehead City are now stocking lots of saltwater fly-fishing equipment. Not only that, fishing catalogs now include page after page of fly rods, reels, lines and flies for virtually every critter that swims in the ocean, and magazines are now featuring "how to" fly-fishing articles for every species from mullet to marlin. Furthermore, saltwater fly-fishing adventures in exotic places are standard fare on many television angling shows.

To be sure, there have long been extraordinary saltwater fly-fishing opportunities in the Florida Keys and Central America for tarpon and bonefish. Ardent striper and bluefish anglers have been using fly rods in the salt at Martha's Vineyard and Cape Cod for decades. But why have North Carolina's tackle shops stocked up on stiff fly rods and large-capacity saltwater reels? And why are people with perfectly good spinning tackle and conventional equipment investing in new fly-fishing equipment to catch their favorite saltwater fish?

The answer is that many game fish that can be found from brackish creeks to the Gulf Stream—except perhaps giant blue marlin and big tuna—can be caught on a fly. Big drum (black and red), giant tarpon, sailfish, white marlin, striped bass, dolphin, albacore and barracuda can all be taken with a fly rod. If you doubt the efficiency of a fly rod, consider these international fly rod records—Pacific sailfish at 136 pounds, tarpon at 188 pounds, wahoo at 53 pounds, yellowfin tuna at 81 pounds, and Pacific blue marlin at 260 pounds.

Big fish don't provide all the fun, however. For most fly fishermen, bluefish, speckled trout, Spanish mackerel and other smaller species are perfect adversaries.

Part of the appeal of saltwater fly fishing is that it offers new challenges for anglers who have already mastered the skills needed in using spinning or conventional gear. Fly fishing is also seen as a way of maximizing enjoyment with less impact on our diminished fisheries. Over the years I have had the good fortune to fish with excellent fly fishermen for a variety of species in several oceans, and I have also taught classes in saltwater fly fishing. Of course, I still enjoy using all types of tackle because different techniques and lures help hone overall skills, yet for me, a fly rod is just more fun when conditions are right.

For most anglers, fly fishing in the salt is not difficult—just different. If this sounds appealing to you, here are some differences you will want to consider before opening your wallet.

### Rods

During the explosive development of new saltwater fly fishing equipment, manufacturers have begun to use names that rival those of fancy sports cars. Rods with names such as Formula XL, RPL-X, PM-10, IMX, GLX and IM6 are just a few of the choices available to saltwater fly rodders. Confusing? You bet.

Even more astonishing are the ranges in price. At the top end, a "name" rod made of graphite will start at $300 and some go well beyond $500. Many of the same manufacturers, however, offer "starter" rods below $150. In many instances the only difference is that the reel seats, wrappings and other fittings available on lower-cost rods are less costly. Indeed, the rod blanks may be identical. Also, you may find that an expensive rod blank used in a top-of-the-line rod just a few years ago has

***Salt-water fish** are generally bigger than fresh-water species, requiring bigger flies. The good news is that the salt-water fly fisherman can often get by with fewer patterns. These are some of the author's favorites: Clouser minnows (lead eyes and inverted hook), bend-back streamers (inverted hook, but unweighted), surface poppers and various minnow-imitating streamers including Lefty's Deceivers.*

been replaced by a lighter, stronger and thinner model. Developments have occurred so quickly that last year's best rod blank may be available this year at half the price.

Most saltwater fly rods are rated between 8 and 12 weight, though some "monster sticks" are available in 13- and 14-weight rods. The vast majority of saltwater rods are 9 feet long, come in two pieces and have a short (2-inch) fighting butt to keep the reel away from your body. Three- and four-piece travel rods are also available that cast as well as two-piece rods. Long (6- to 8-inch) fighting butts should be avoided.

For most fly fishing on the North Carolina coast, I prefer a 9- or 10-weight rod that's big enough to handle false albacore or large bluefish, yet light enough that you can enjoy catching Spanish mackerel or weakfish. Granted, a 9- or 10-weight rod may be a bit much for smaller fish, but such rods are necessary to beat the wind when casting large flies and poppers in a breeze.

You will find that most saltwater rods have a fast action that helps the caster develop higher line speeds to punch through wind and cast greater distances. Some rods also have a stiff butt section to give the rod more lifting power when playing large fish.

When you buy a fly rod to use in salt water, make sure it has been designed with large stripping guides and snake guides. The larger, stronger guides found on all good saltwater rods are necessary because of the strength and speed of many fish. When a king mackerel, false albacore or cobia takes your offering, fly lines can tangle as they go through guides at incredible speeds. An accidental knot or loop can pass through large guides but will clog in smaller guides, damaging the rod or causing the fish to break off.

Don't put too much stock in casting great distances. Virtually all saltwater rods in the hands of a good caster will throw the entire line 90 to 105 feet; however, the vast majority of saltwater fish will be hooked on casts no longer than 30 and 60 feet. Long casts are useful, but accuracy with short- to moderate-length casts is often more important.

## Reels

A decade ago only a handful of companies made reels suitable for saltwater fly fishing. Fin-Nor and Seamaster were the top of the line, but the Pflueger Medalist Model 1498 was, and still is, the most popular low-priced reel suitable for saltwater fly fishing (below $50). Today, the pages of fly-fishing magazines are filled with advertisements for gold and black, anodized aluminum, high-dollar works of art. Abel, Orvis, Billy Pate, Islander and other reels too numerous to mention can dent even the healthiest bank account. The one consolation is that most of these expensive reels are likely to last a couple of lifetimes.

Apart from the Pflueger 1498, there are also a number of moderately priced reels at less than $200 that are more than adequate for most of North Carolina's saltwater targets. Martin, Orvis, STH, Lamson and Ross are examples of quality products in

***Fly fisherman** familiar with gear and tactics that work well for freshwater species like trout, bass and bluegills will encounter some differences when they make the transition to salt water. Some of these differences are readily apparent when the more delicate freshwater gear (right in photo) is compared with the bigger flies, stouter fly rods and reels with rugged drag systems required for salt water (left in photo).*

the middle price range.

So what makes a saltwater fly reel different from those used for largemouth bass. Like reels used for trout and bass, most saltwater reels are direct drive (the handle turns when the fish runs), but no reel can be considered a saltwater model unless it has a smooth drag that will function well when a fish makes long, powerful runs. Saltwater fly reels are also made to hold 150 to 300 yards of 20- or 30-pound test braided Dacron backing. Once the fly line is out of the guides, it's the backing that allows a fly fisherman to hang on while a hot albacore heads for Portugal.

Few freshwater fly reels have either the drag or line capacity for saltwater use. Equally important, most freshwater fly reels are not made of anodized aluminum and stainless steel to withstand the corrosive nature of salt water. Good saltwater reels also have drags built to withstand the extreme heat that builds up when a fish is running.

When buying a saltwater fly reel, make sure it has the correct weight and line capacity to match the rod. For example, a reel that will work well on an 8- or 9-weight saltwater fly rod would be too small for a 12-weight fly rod. Finally, make sure you get a reel that is easy to clean after use. Reels with lots of screws and springs are more apt to corrode after use in salt and sand. Some new generation fly reels, like the Islander, have only a few moving parts, making them much easier to maintain for a lifetime of fishing.

### Lines and Leaders

If you are accustomed to small-diameter fly lines for trout, you will be in for a shock when you see the dizzying array of fatter "clotheslines" used in saltwater. Scientific Anglers, Cortland and Orvis are the major manufacturers, and they offer various weight-forward tarpon tapers, bonefish tapers, hot-weather lines, cold-weather lines, rocket tapers and sinking lines in sizes 8 to 14. There aren't any bad lines on the market, and there shouldn't be at $30 to $50 a pop. Choose a color you can see. Most studies say fish don't care.

I have a closet full of fly lines and I've used most available types. The truth is that 95 percent of all my saltwater fly fishing is done with a weight-forward floating fly line. Spanish mackerel, bluefish, bonito, dolphin and speckled trout can all be caught on a floating line. Again, make sure that you have rod, reel and line that are properly matched. Because saltwater fly rods are generally stiffer and stronger than their freshwater counterparts, you can generally get away with using a line weight one size heavier than is recommended for use with the rod (a 10-weight line will work on a 9-weight rod).

The type of leader you use will depend on the type of fish you are seeking. Fish that have good eyesight, like false albacore, will often necessitate the use of a long leader (12 feet) tied directly to the fly. For cobia or amberjack, use a 12- to 16-pound test leader tipped with an 80- to 100-pound monofilament shock tippet that will withstand the abrasion of these fishes' rough mouths. Wire-tipped leaders are necessary for saltwater fish with sharp teeth such as king mackerel and barracuda. Most saltwater fly-fishing books will show you how to construct the right leader.

In saltwater fly fishing, the heaviest leader allowed for record purposes under International Game Fish Association rules is 20 pounds. For almost all saltwater fly fishing

***Buzz Bryson** of Raleigh hoists a cobia that he caught on a 10-weight fly rod and a streamer fly. The fish was spotted near a buoy—structure often frequented by cobia—and it eagerly gobbled Bryson's fly when he cast to it.*

on the North Carolina coast, I use leaders with a breaking strength of 8 to 16 pounds, depending on the type of fish.

The IGFA keeps a separate listing for fly-rod world records. Tippet class records are kept for 2-, 4-, 8-, 12-, 16- and 20-pound test. At least 15 inches of the leader must test within the line-test category. Probably the most famous fly-rod record from North Carolina waters is the 12-pound class record for red drum—42 pounds, 5 ounces (1981).

Many class records for red drum, bluefish, Spanish mackerel, false albacore, king mackerel and others are well within reach of anglers fishing North Carolina waters. For more information on fly-rod world records contact the IGFA at 1301 East Atlantic Blvd., Pompano Beach, Fla. 33060.

**Techniques**

The slow, lazy loop you use on a trout stream or while fishing for bedding bluegills will be blown back in your face in the average 10- to 15-knot winds found on the coast. To catch a bluefish, albacore, drum or their cousins you have to (1) get close enough to make the cast, (2) get the fly to your target in spite of wind, and (3) get the fly moving so that it imitates your quarry's natural prey (a minnow, shrimp, etc.).

With a fly rod you can't just uncork a 100-foot cast into the wind the way you can with a Hopkins lure and a spinning rod. Stealth is important. I often stake out the edge of a drop-off near a creek mouth or next to a jetty and let the action come to me. If you chase schools of fish with your outboard wide open, you will often frighten the fish. If you have to move closer to schooling fish like Spanish mackerel, move well upwind of the school, cut your motor and drift to your target area.

Most fish are caught on a fly within 30 to 60 feet. It's helpful to be able to cast the whole line, but it's rarely necessary. It's more useful to achieve quickness and accuracy inside of 60 feet. Modern graphite rods are designed to deliver higher line speeds and tighter loops to help you punch through the wind. Without accuracy, distance is meaningless. Practice casting to targets—I use paper plates—in an open field before you go to the sea.

The most important thing to learn, and perhaps the most difficult, is loop control. A fairly tight loop on your forward cast and backcast is necessary for consistent accuracy and distance. Let the rod do the work.

Timing, not strength, is the key to good casting. As saltwater casters refine their techniques and tighten loops, they usually learn to double-haul, a technique used to add more line speed.

Under ideal conditions you can often see fish moving under the surface. At other times, birds or showering minnows will help mark their location. To make a good presentation of the fly, you will want to place it in front of and beyond fish that are moving laterally in front of you. If a fish or school of fish is moving directly toward you, the fly should be cast to the side and in front of the fish. Start moving your fly with a combination of short and long "strips" to attract a strike. While retrieving the fly make sure your rod tip is close to the water and pointed at the fly.

People often compare saltwater fly fishing to hunting. To hit the target, a shotgunner knows to mentally calculate the speed of the bird and the wind speed to know how far to lead. Fly casters must learn to make the same kind of wind and fish speed calculations.

If you are going to take up saltwater fly fishing, you don't need to give up the other methods available to you. Lefty Kreh, a fishing friend, and one of the best casters the sport has known, is equally talented with spinning and plug tackle. Different methods can complement each other. I often fly fish from my boat while a friend spin fishes. Many fish like bluefish and dolphin run in schools, and a hooked fish will often have several buddies with him. I have caught fish by casting beside or behind a fish hooked by a partner. A couple of years ago, while fly fishing, I caught a 50-pound cobia that was following a smaller, bait-hooked cobia.

## Flies

Trout fishermen are familiar with the phrase "Match the hatch." They know that by matching flies to the size and color of aquatic insects on which trout are feeding, they will catch fish. Saltwater flies also often match the natural foods on which your quarry is feeding, and they may imitate minnows, shrimp, crabs and even squid. As the saltwater fly fishing boom in this state and around the country has accelerated, so has the number of extraordinarily realistic fly patterns. I firmly believe, however, than an angler armed with Clouser minnows, Lefty's Deceivers and a few saltwater popping bugs in a variety of sizes and colors can catch saltwater fish anywhere. These are truly universal patterns. You will be less confused and probably more successful, if you stick to a few patterns and learn to fish them well.

An often overlooked bonus of fly fishing is that fish caught on flies are easier to release, especially if you bend the barb down. Unlike lures that often have multiple treble hooks, almost all flies are tied on single hooks. Fish that take a fly are less likely to be gut-hooked, while fish caught on bait frequently swallow the hook making a safer release more difficult.

***It would be** a salt-water fly fisherman's dream to own this array of rods and reels, but you could add an addition to your house for what this batch might cost, especially the custom-built reels. Even so, good quality salt-water tackle is available at affordable prices with a very serviceable rod and reel starting at about $300, or even a bit less.*

## Boats and Surf

Under the right conditions, it is possible to do extremely well fly fishing from the beach. I have caught Spanish, blues, bonito, speckled trout, drum and flounder on a fly rod while fishing from the surf. However, when fish are moving, or when you want to move, a boat makes it easier.

A good fly-fishing boat must meet two requirements. First, it should be as free of clutter as possible. The fewer grab rails, cleats, mooring and anchor lines there are on the deck, the less chance your fly line will have of snagging something. It's also a good idea to make sure you have a safe place to store expensive fly rods on your boat. Protective tubes and tie downs for assembled rods are a must. A good fly-fishing boat should also have at least one raised casting deck. Either a bow or stern platform allows the caster to stand a foot or two higher above the water, making it easier to see fish and to deliver casts.

Finally, make sure your boat is suitable for North Carolina's coastal waters and inlets. I've fished in many of the great fly-fishing boats designed for the Florida Keys, and under ideal conditions they may suffice in North Carolina. Still, I would not want to be in any "flats boat" during rough weather on Pamlico Sound or when going or coming through most of our inlets. Although some new all-purpose fly-fishing boats are available, the typical bonefish/tarpon boats with their low freeboard are simply not made for North Carolina waters.

Perhaps it is the higher level of skill required that is attracting so many to the quiet revolution of saltwater fly fishing. Golfers know what it feels like to hit a long, straight drive. Tennis players work to perfect their serves. Learning to cast well, especially under adverse conditions, is very satisfying even when the fish don't cooperate. And yet, it is not a sport just for experts. It can challenge you for a lifetime, and few places offer greater variety of options than the sounds and ocean waters of North Carolina.

*Hadrosaurus*

# DINOSAURS
## Down the Cape Fear

The fossils of dinosaurs that have been found in North Carolina reveal a fascinating picture of life here millions of years ago in the Cretaceous period.

written by David S. Lee ©1994
photographed by Melissa McGaw
illustrated by David Williams ©1994

Don Sweeney had allowed me a peek at the cover just before school, so all morning I had been impatient, restlessly awaiting our mid-morning recess. We were out the door, down the hall, and in the far corner of the schoolyard in record time. Don carefully unfolded his magazine. We crouched in silent amazement, our backs shielding the magazine from view as we studied each page carefully. We reverently inspected the large centerfold. I followed each line in the fold-out. The colors of the flesh were outstanding, and we could hardly contain our excitement. Here, all on one page, were *Brontosaurus*, *Triceratops* and *Tyrannosaurus*.

We couldn't begin to pronounce the long names at the bottom of the page, but that wasn't really important. On this one single fold-out, the editors of *Life* magazine had provided everything I had hoped to know about dinosaurs.

I don't recall if that was second grade or third, but Don and I were fascinated by the prehistoric reptiles and combed the school library for anything that would provide more information, or at least pictures. One weekend we created our own mural, tracing our favorites from illustrations and adding our own versions of dinosaurs. On a roll of white shelf paper spread across the kitchen floor, we brought prehistory back to life in brilliant Crayola. We took it to school and squirmed with pride as our teacher hung it over the chalkboards where it stretched from wall to

***David Lee checks out** a site that has yielded dinosaur fossils in a ledge along the Cape Fear River, while his wife, Mary, and their dogs stretch their legs.*

***Fifty-foot crocodile (Deinosuchus) attacking Hadrosaurus***

wall. Don and I sat in a dazed state of self-induced glory until we realized that our masterpiece was being criticized. No one had told us that Union and Confederate soldiers never visited prehistoric landscapes, or that World War I biplanes did not shoot down dinosaurs with machine guns. We were mortified and vowed never again to volunteer anything for school.

In the years that followed, my interest in dinosaurs became less public, and I finally began to acquire a better understanding of geologic time. I also gradually accepted the fact that I would never personally be able to visit the Gobi Desert or unearth the gigantic remains.

Yet my interest has remained strong all these years, and you can imagine how I felt when I learned that dinosaurs could be found in my home state of North Carolina. Not only that, it turns out that one of the most interesting sites is along the Cape Fear River just a few miles south of where my wife, Mary, grew up, and a few miles west of where we owned some property.

One weekend last fall I loaded the car with all the necessities—drinks and a camera. Although it was tempting, I did not include digging instruments because many important paleontological deposits have been ruined by well-meaning amateurs. Mary took care of the minor items—the boat, a picnic lunch, our two dogs and gas for the outboard. As we shoved off, the dogs sat with ears and tongues flapping in the wind, unaware of the possibility of gigantic 65 million-year-old bones.

We didn't expect to find a whole dinosaur because all the fossils that have been recovered from this particular site are fragments of individual disarticulated, or disjointed, bones. After several hours of searching at the site along the river bank, we found a few black fossilized sharks' teeth and some splintered fragments of unidentified bone. And who knows, perhaps my 2-inch bone splinters were from a dinosaur.

The dinosaurian assemblage that has been recovered here over the years is not particularly diverse and only four species of dinosaurs have been found. The most abundant remains are from a flat-headed duckbill dinosaur (Hadrosaurines). The material found along the Cape Fear cannot be identified with certainty to any particular duckbills, and not knowing which species is represented makes it difficult even to know the size of the dinosaurs found at the Cape Fear site. However, educated guesses, based on more complete skeletons, suggest that this particular duckbill probably exceeded 40 feet in length.

Most likely these remains represent *Hadrosaurus foulkii*, one of the first species of dinosaurs discovered in North America. The first specimen was found in 1853 in Haddonfield, N.J. The work that followed later revealed that this is the most abundant of the Cretaceous North American species of dinosaurs. The teeth of the Haddonfield specimen are similar to teeth that have been found in Montana and England and provide the earliest clue that dinosaurs ranged throughout the world. The Haddonfield find also threw another important element into the early understanding of the advanced dinosaurs. When Joseph Leidy, professor of anatomy and director of the Philadelphia Academy of Natural Sciences, described this species, he was amazed at the disproportionate size of the creatures' front and hind limbs. The thigh bones were nearly twice the length of the upper arm. He concluded that "the great extinct herbivorous lizard may have been in

the habit of browsing, kangaroo-like, in an erect position on its back extremities and tail." While this does not seem strange to those who grew up watching cartoons and Japanese horror movies or, more recently, had a chance to visit "Jurassic Park," the idea of large dinosaurs running on powerful hind legs was revolutionary in the 1850s. Scientists initially assumed that dinosaurs walked on all fours like other large animals. These bipedal dinosaurs with three-toed feet also seemed remarkably similar to birds, which provided a logical explanation for the large fossil "bird" tracks found 50 years earlier in the Connecticut River Valley. There had been no skeletons associated with these tracks, and people could only imagine the bird-like animals that might have produced those tracks. It would be many more decades before enough evidence was gathered to show the close relationship between modern birds and dinosaurs.

Another duckbilled dinosaur has also been found at the Cape Fear site. There is no doubt about its identity—it is *Hypsibema crassicauda*, a huge herbivorous species. Paleontologists have recognized two groups of duckbills, the flat-headed Hadrosaurine and the elaborately crested Lambeosaurinae. While both are called duckbills, they apparently evolved from quite different groups. *Hypsibema crassicauda* is one of the crested types and in size was every bit as big as *Tyrannosaurus*.

One of the more interesting things about duckbills is that unlike birds or reptiles, they chewed their food. Modern reptiles have teeth, but their teeth are designed only for holding prey. Reptile prey is usually swallowed whole or the animal is crudely dismembered and swallowed in big chunks. Duckbill dinosaurs had powerful cheek muscles and thousands of hard, sharp teeth that lined the mouth. Some whole duckbill fossils have been found with petrified traces of their last meals in their stomachs. These dinosaurs ate the coarse leaves, twigs and bark of upland plants and are the ecological equivalents of the antelopes, gazelles and zebras that currently roam semiarid uplands.

There are a number of theories about the actual function of the crest of these dinosaurs. The most feasible is that they were used as signaling devices. The distinct shape (and probably the color) of the crest of each species would allow distant visual recognition. Furthermore, the structure and hollow passages probably allowed the crest to function as a resonator. Because of the different shapes and sizes of the duckbills' crest, it is likely that each species had a distinctive call. The late Cretaceous may have been quite a noisy time.

For years scientists wondered about the predator pressure on large duckbilled dinosaurs. The only predator believed large enough to overpower and dismember them was *Tyrannosaurus rex*. Based on the small number of fossils of this predator, however, it was not clear how the rare *Tyrannosaurus* could keep the numbers of the abundant and large duckbills in check. The duckbill's plant-consuming habits could have quickly stripped the countryside bare of vegetation. One possible answer may be seen in the Cape Fear deposit. Fossil bones of *Deinosuchus*, the terror crocodile, have been found here. All of the fossils of this crocodile have been found at sites where remains of the duckbills are common (Wyoming, Montana, Texas, Delaware, New Jersey and North Carolina). *Deinosuchus* greatly exceeds the largest living crocodiles in size with estimates ranging from 36 to 50 feet and a possible weight of 6 tons. With massive jaws and long, pointed teeth these crocs probably grabbed duckbills and other dinosaurs at water holes in much the same way that African crocodiles snatch wildebeast and other large mammals today. A sudden lunge for the snout combined with a body spin pulled the animal down into the water. It was held until it drowned.

Another type of dinosaur found here is tentatively identified as *Ornithomimus*, one of a number of the late Cretaceous period forms that led paleontologists to conclude that birds and dinosaurs have a lot in common. The *Ornithomimus* seemed ostrich-like, and like other bird-like dinosaurs it had a lightweight skull, huge eyes and a large brain. The brain was proportionately larger than those found in modern birds, suggesting that complex social behaviors were possible. Most important, these dinosaurs didn't have teeth, but instead had beaks that were much like those of birds. Although they couldn't fly, they were probably among the swiftest-running terrestrial animals to ever live. A large pelvic canal suggests that they laid eggs the size of an ostrich's.

Other remains of *Ornithomimus* are known

## Schneider Leads Volunteer Dinosaur Stalkers

As curator of the fossil collection at the N.C. State Museum of Natural Sciences, Vince Schneider oversees a collection of 42,000 fossilized specimens. A large percentage of these are specimens he personally acquired during the 15 years that he has been working with the museum. While 15,000 of these fossils represent remains of vertebrates from North Carolina, less than two dozen specimens are of actual dinosaurs found in the state. Schneider notes that landowners and fossil collectors can be of great assistance in locating new Cretaceous deposits in the state, and he encourages them to contact the museum about new localities. To better understand this period of the state's past, the museum would like to increase its holdings not only of dinosaurs but of all Cretaceous fossils. Several major "digs" are currently being planned for North Carolina.

Remarkably, Schneider's curatorial accomplishments are done on a volunteer basis since the museum has no staff position for the fossil collection. And what does he do on vacations? You guessed it. Schneider is currently working on several major Jurassic and Cretaceous dinosaur deposits in Wyoming. Many important specimens from these sites have already been added to the museum's collections.

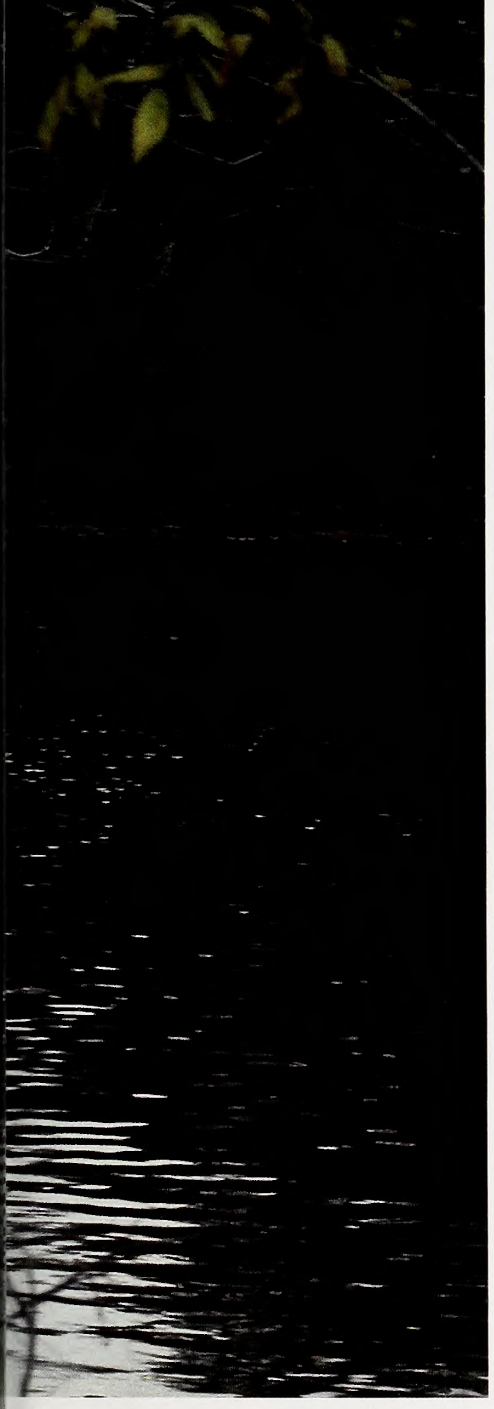
Currently, 30 active volunteers work in the museum's Paleontology Department, sorting, preparing and cataloging fossils.

***Vince Schneider** and his other volunteers at the Museum of Natural Sciences have collected many of the dinosaur fossils found in North Carolina. The teeth in the foreground once belonged to a crocodile that reached lengths of 50 feet and probably fed on Hydrosaurs.*

Visitors can watch specimens being prepared and talk to the volunteers as they work in a lab in the museum's exhibit hall. Interested in helping? Know of any sites? Call 919-733-7450.

**There could be** *great beasts from the Cretaceous lurking around the very next bend on the Cape Fear. Of course, they have been dead for 64 million years, but where else in North Carolina can you find fossil dinosaurs?*

**Ornithomimus**



from New Jersey, Colorado, Utah, Alberta and Mongolia. Reconstructions show they ranged in size from about 6 to 12 feet. Since they had nasal horns, it is fun to think of them dashing here and there honking away.

A single carnivorous dinosaur has been found in the Cape Fear deposit. It is a medium-sized species of one of two genera—Dryptosaurusor Albertosaurus. The later genus is less advanced, less robust, and has smaller teeth than the well-known *Tyrannosaurus*, and some paleontologists believe that *Albertosaurus* may have specialized in eating small duckbills, leaving the large duckbills and formidable horned dinosaurs for the larger *Tyrannosaurus*. These smaller predators were in the 15- to 20-foot range. With binocular vision and powerful hind limbs, they were likely swift and efficient predators.

*Dryptosaurus* a key animal in the now famous academic battle between the two leading paleontologists of the post civil war years—Edward Drinker Cope, a paleontologist in Philadelphia, and Yale's dinosaur expert O. C. Marsh. The controversy seems foolish with so much undescribed material available at the time, yet it was a driving force in advancing science and the quest for new discoveries in North America. It seems to have started when Cope made a mistake in the reconstruction of a dinosaur by placing the skull on one of the tail vertebra. When Marsh brought this error to Cope's attention, Cope announced that he had not studied these animals for years without learning to recognize one end from the other, but secretly he tried to buy up, at his own expense, all the copies of the publication showing his error. Marsh managed to hold onto two copies. Their dispute became rancorous. Cope, for example, refused to recognize the name *Dryptosaurus* that Marsh had given to a species that Cope had discovered and initially named *Laelaps*. Even though this name was not valid according to rules that govern such things, Cope paid no attention to this minor discrepancy and continued to use the name *Laelaps* until his death.

Other fossilized remains found at the Cape Fear site tell us much about the region as it appeared 65 million to 140 million years ago. Remains include a number of extinct types of sharks and rays, ladyfish, coral-inhabiting fishes and two types of seagoing lizards, all marine species. Two turtles and two kinds of crocodiles found there indicate that this site may have been near where a freshwater river entered an estuarine bay. By the middle of the Cretaceous period, the plants were similar to those found in North Carolina today—magnolia, sassafras, poplar, maple, oak, tulip trees, sweet gum and bald cypress, to name a few. Thus, it is not difficult to visualize the types of habitat that supported our dinosaurs.

Nearly all of the Coastal Plain of the state is underlaid by Cretaceous strata, but most is covered with more recent deposits. It is fun to imagine what other beasts from times past lie buried beneath our Coastal Plain. Here on the Cape Fear, and at similar sites, rivers have cut through the upper layers exposing fossils. As early as 1794, William Bartram in his travels through the state commented on the geologic exposures along the Cape Fear.

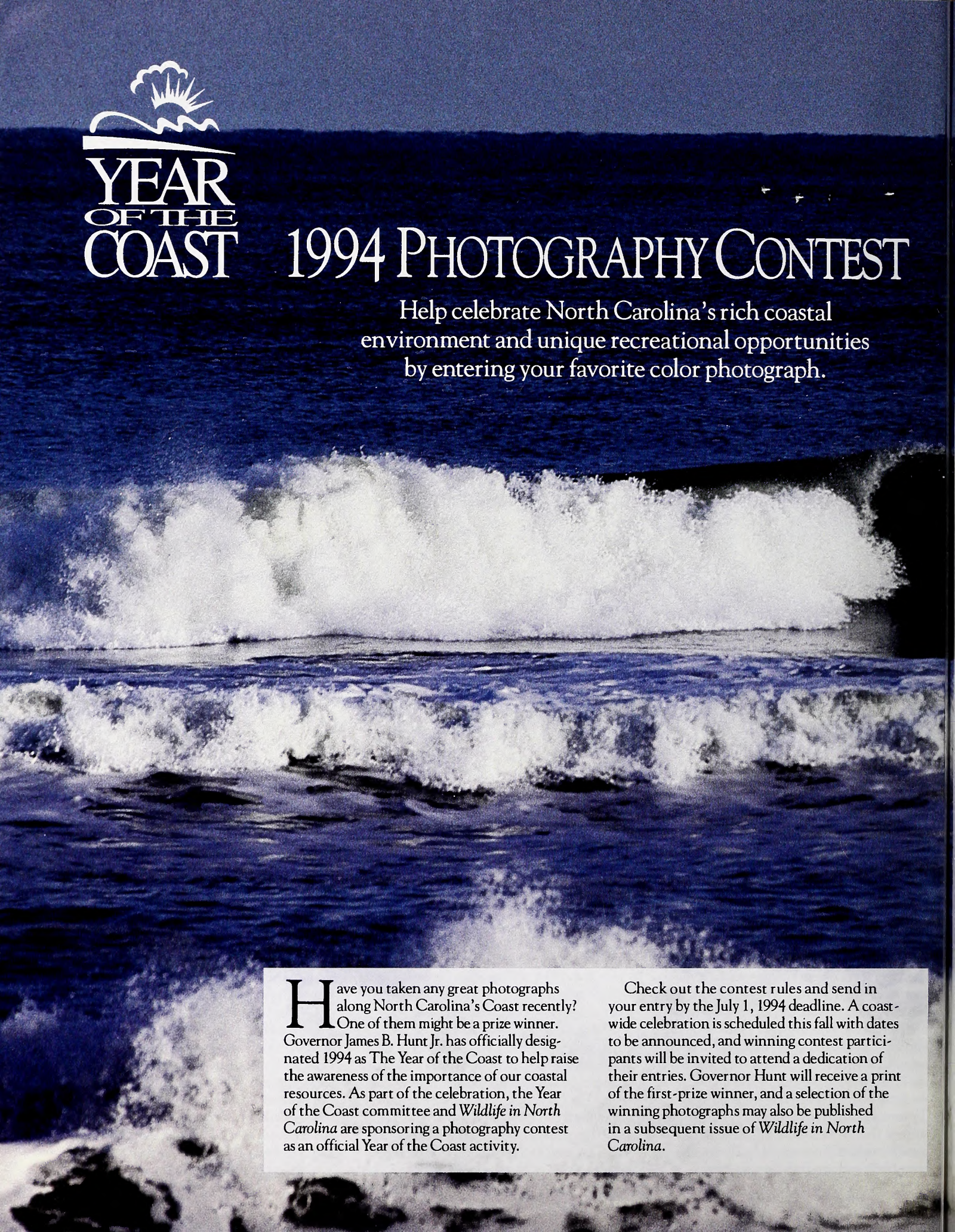
The site we visited was discovered just after the turn of the century, but the material excavated there was stored in the National Museum where it remained unstudied for a number of years. The Cape Fear deposits were not surveyed until the 1960s, and it was not until 1979 that paleontologists studied the entire fauna as a unit and provided a true picture of what this part of North Carolina looked like during the Cretaceous period.

***Dryptosaurus***

While I scanned the eroded bank and the sand that had been washed under it, I thought about these four dinosaurs that once lived here. Our understanding of these reptiles has changed considerably since the editors of *Life* commissioned my favorite centerfold.

We tend to lump all dinosaurs into a stereotype, but with 120 million years of change, they certainly were more varied than most people imagine. The slow, dim-witted brutes of the early days of dinosaurs were unlike the agile, intelligent, highly social and apparently warm-blooded creatures of the late Cretaceous. These dinosaurs did not lumber around with their tails dragging on museum floors. They ran through the woods with tails straight out behind them for balance.

On the return trip back upriver, Mary cut the motor as she watched a pair of pileated woodpeckers fly over the south shore. I caught the male in my binoculars as he alighted against the upper trunk of a cypress. We watched him raise his crest with each trumpet-like vocalization. In the distance the female answered his loud, non-musical call. Were we watching feathered dinosaurs? Would Don Sweeney be impressed? ☐



YEAR OF THE COAST

# 1994 PHOTOGRAPHY CONTEST

Help celebrate North Carolina's rich coastal environment and unique recreational opportunities by entering your favorite color photograph.

Have you taken any great photographs along North Carolina's Coast recently? One of them might be a prize winner. Governor James B. Hunt Jr. has officially designated 1994 as The Year of the Coast to help raise the awareness of the importance of our coastal resources. As part of the celebration, the Year of the Coast committee and *Wildlife in North Carolina* are sponsoring a photography contest as an official Year of the Coast activity.

Check out the contest rules and send in your entry by the July 1, 1994 deadline. A coast-wide celebration is scheduled this fall with dates to be announced, and winning contest participants will be invited to attend a dedication of their entries. Governor Hunt will receive a print of the first-prize winner, and a selection of the winning photographs may also be published in a subsequent issue of *Wildlife in North Carolina*.

# Contest Rules

1) The contest is open to all amateur and professional photographers. Photographs must have been taken since January 1993, and may not have been awarded a prize in any previous contest.

2) Each contestant is limited to one entry, and the entry must be accompanied by a completed entry form. Entries must be either one 35mm color slide or one color transparency (any size format). No color prints, color negatives or black and white photographs are acceptable. The title of the entry and the name and address of the photographer must be affixed to each entry (This information can be written in pencil on the cardboard or plastic 35mm color slide mount, or on a label attached to a protective clear covering of any slide or larger color transparency). Mailed entries should be protected with cardboard backing.

3) Original slides or transparencies are preferred. If duplicate slides or transparencies are submitted, contestants must agree to provide the original to the Year of The Coast committee upon request. Entrants must also agree to assign publication rights for their submission to Year of the Coast and to *Wildlife in North Carolina* magazine. Year of the Coast will take utmost care of all submissions, but will not be responsible for lost or damaged entries. If you wish to have your entry returned, you must submit it with a stamped, self-addressed envelope.

4) The deadline for entry is July 1, 1994 (entries must be on hand or postmarked no later than that date). Winners will be announced August 1.

5) Photographs and titles should celebrate 1994 as the Year of the Coast, and must have been taken along North Carolina's coast. Contest entries will be judged based on the quality of the photograph and how well the photograph and its title illustrate the value of stewardship and the beauty and benefits of North Carolina's coastal environment. Subject matter may vary widely to include scenics of the surf, dunes, marshes, sounds, waterways or other related natural resources or coastal landmarks, as well as, wildlife, fishing, boating and people enjoying our coastal resources.

6) Three cash awards will be given, plus honorable mentions:

First Place—$500.00
Second Place—$250.00
Third Place—$100.00
Honorable Mentions

7) Employees of the N.C. Wildlife Resources Commission, Division of Coastal Management, Department of Environment, Health and Natural Resources, N.C. Coastal Federation and the Institute of Government are not eligible to participate.

8) Any questions regarding this contest or entries should be directed to the Year of the Coast office at 1-800-232-6210.

# Year of the Coast Photography Contest Entry Form

Fill out this entry form, enclose with your photograph and submit to:

Year of the Coast Photo Contest
P.O. Box 4429
Emerald Isle, N.C. 28594

Name _____

Address _____

City _____ State _____ Zip _____

Daytime Phone No.(____) _____

Title of Entry _____

_____

Indicate if entry is ☐ original slide or transparency or ☐ duplicate. Contestants must agree to provide the original to the Year of the Coast committee upon request.

☐ No, my entry need not be returned.

☐ Yes, please return my entry in the stamped, self-addressed envelope I have provided.

I hereby grant permission for the Year of the Coast committee and/or *Wildlife in North Carolina* to publish the above entry or use it with functions in connection with this contest. I further understand that the contest sponsors are not responsible for lost or damaged entries.

Signed _____ Date _____

KEN TAYLOR

*Pilot Project Will Test Technique*

## Helicopter Used for Aerial Lespedeza Seeding

*Written and Edited by Vic Venters*

One of the greatest challenges facing small game biologists in the Southeast today is successfully integrating management for quail and rabbits with modern agricultural and silvicultural practices. In particular, intensive pine monoculture has proven detrimental to many wildlife species, including quail; however, it can produce good bobwhite habitat for about five years after a tract is cut.

A pilot project using aerial reseeding with helicopters was launched in mid-February to determine if the technique can be effective in establishing lespedeza stands on recently timbered tracts. Lespedeza provides good brood habitat for quail and rabbits during breeding season and food in the winter. However, lespedeza is often scarce on intensively managed timber tracts.

The project involves Wildlife Commission and Quail Unlimited biologists, corporate and private landowners and QU volunteers. Using a helicopter, the team has seeded 41 tracts totalling 3,300 acres in Anson, Richmond, Montgomery and Moore counties. On those tracts, approximately 660 acres were seeded with 10,000 pounds of kobe and Korean lespedaza.

"The great advantage to using a helicoptor is the speed at which they can seed a tract," said Donnie Buckland, Quail Unlimited's regional director for North Carolina. "In a couple of passes—30 seconds or so—we can seed an entire tract and be off to another one. This is a job that normally would have taken us all day per tract with hand-cranked seeders. Helicoptors also have the advantage of being able to land in a small cleared area to be refueled and have their seed hoppers quickly refilled."

VIC VENTERS

***Wildlife Commission** biologists used a helicopter this spring to seed recently timbered areas with lespedeza. Quail Unlimited helped fund the project, which should provide good quail habitat for up to five years.*

The lespedeza seeding was concentrated along good cover so that birds eventually using the stands will not be overly exposed to predators, said Terry Sharpe, the Wildlife Commission's small game project leader. "We've concentrated the seed along woods edges and next to streamside management zones."

In the past, the Wildlife Commission has done some aerial reseeding with fixed wing aircraft in North Carolina, though on a much smaller scale. "If this pilot project is successful, we could definitely see much wider use of aerial seeding on timbered tracts.

In addition to benefitting wildlife, there are also benefits for landowners. "Lespedeza provides excellent erosion control when seeded around streams and can help water quality," Sharpe added. "Lespedeza is also a nitrogen fixer in the soils and at least one study has indicated that pines grow faster when located in lespedeza patches."

Financial contributers to the project include the Wildlife Commission, the U.S. Forest Service, Quail Unlimited and the Sandhills chapter of Quail Unlimited. The seeding was done in conjunction with the following landowners: Bowater Woodlands Inc., Federal Paperboard, Williamette, Jordan Lumber & Supply Inc. and five other individual landowers. The helicopter and its crew was provided by Summit Helicopters of Roanoke, Virginia.

*Individual Copies Free*

## Firearms Safety Pamphlet Available

The National Shooting Sports Foundation is making available a new brochure titled "Firearms Responsibility in the Home." The brochure is designed to emphasize the critical importance of responsible firearms storage in the home.

"The title for this brochure was chosen very carefully," the pamphlet states. "This is not another pamphlet about firearms safety, safe firearms handling or storing firearms in the home. This brochure is about the responsibilities each and every one of us must accept when we bring firearms into our homes. Too often, these (home firearms) accidents result from irresponsible firearms ownership."

The brochure features a special "Message to Kids" panel that includes a "Firearms Responsibility Pledge" which youngsters can sign and present to their parents. The booklet is available at $65 per thousand and makes a good handout for gunshops, gun ranges, or wildlife and hunting clubs. Individual copies are available free by writing: National Shooting Sports Foundation Inc. Flintlock Ridge Office Center, 11 Mile Hill Road, Newtown, CT 06470-2359.

*Clearcutting Issue is Contentious*

# Appalachian Ruffed Grouse Article Proves Controversial

Dear Editor:

The article entitled "Ruffly Speaking" (*Wildlife in North Carolina*, January 1994) contains considerable misleading information about the habitat of ruffed grouse in North Carolina. The article states that the habitat of grouse is "sapling hardwoods," "regenerating young forests," and the "snarl of vines and thick brush that grouse prefer." The reader gets the inference that this is year-round habitat. This would be incorrect.

As a 30-year veteran birder in North Carolina, I can tell you that anyone who has ever looked for ruffed grouse during warmer months—April to September—almost always finds the birds in mature hardwood or mixed forests, such as cove forests, northern hardwood forests, oak-hickory forests, and forests where some conifers are mixed with hardwoods. The males drum, and the females nest, in these mature forest habitats. I have never seen or heard birds in clearcuts or other thickets during this period.

I suspect the confusion over habitat preferences is caused by the time of year when hunters and, perhaps, wildlife biologists are in the field looking for grouse. The hunting season for grouse is mid-October to the end of February. At that time of year, most of the grouse undoubtedly have moved from mature hardwood forests to the denser cover of sapling hardwoods and thickets, where they are found by hunters. Some grouse, however, remain in mature forests in the winter, particularly where there is evergreen cover such as thickets of rhododendron or mountain laurel.

Thickets may well be important cover for the birds during colder months, when they are hunted. But the birds spend more than half the year in mature forests, where reproduction occurs.

*—Harry LeGrand Jr., Raleigh*

*Author's Response: Harry LeGrand is an environmental specialist with the N.C. Natural Heritage Program, and his letter raises several valid points about the importance of mature forest conditions for ruffed grouse, conditions that were perhaps understressed in the article. However, it is accurate to state that optimum ruffed grouse habitat is created through a mixture of mature forest conditions and early successional habitats. When and where Appalachian forests should or should not be managed for ruffed grouse is another matter entirely—and is an issue that is complex and controversial—as I hope the article made clear. To clarify the habitat issue, the author and Terry Sharpe, the Wildlife Comission's small game project leader, asked Dr. Ralph Dimmick, Professor of Wildlife Science at the University of Tennessee, to summarize in the following some of his findings based on 15 years of researching ruffed grouse populations in the Southern Appalachians.*

Dear Editor:

We have found that introducing small 5- to 20-acre clearcuts into a tract of mature timber has a positive and measureable impact on numbers of birds on the area in contrast with the numbers in adjacent unharvested forest. On one area of about 1,000 acreas (in eastern Tennessee) with no clearcutting, populations varied from 10 in 1983 to 2 in 1984 to 12 in 1993. On a companion area, the number of grouse increased steadily from none in 1983 to 26 in 1993. These changes began on the second tract after clearcutting was initiated, and escalated as cutting continued.

Both of these areas were dissected by a small creek with a band of laurel. On the areas with no cutting, grouse oriented to the edges of laurel thickets to establish their drumming territories. On the cut areas, however, the males oriented strongly toward the edges of clearcuts, and occasionaly established drumming logs in very young clearcuts. We have encountered drumming logs in older clearcuts (10-20 years) as well. In addition we also see broods in clearcuts, particularly along haul roads traversing clearcuts. When these have been seeded to clover, the proximity of food to the dense woody cover is a good combination.

Grouse can survive without clearcutting in Southern Appalachian forests, albeit at lower population levels. They do use mature hardwoods for nesting, and the laurel and rhododenron thickets do provide protective cover. On the other hand, the clearcuts provide excellent protective and escape cover during all seasons of the year. Tracts with about 10 to 15 percent of their area in clearcuts 5 to 12 years old will have decidedly more grouse than comparable areas that lack this young, successional growth in similar amounts.

*Ralph W. Dimmick*
*Professor of Wildlife Science*
*University of Tennessee, Knoxville*

Dear Editor:

The tone of the article by Vic Venters "Ruffly Speaking" (*Wildlife in North Carolina*, January 1994) gives the impression that ruffed grouse are on the road to endangered species status if the current public indignation over national forest clearcuts and below-cost timber sales continues. I am sure the author did not intend this to be the main message. The article is a good discussion of the resource management issues impacting ruffed grouse populations, but let us recognize that the status of grouse is only one of many issues surrounding national forest management, and grouse are not even threatened or particularly uncommon compared to many other species of plants and animals. Take black bear, for instance, a much harder species to manage because of the enormous areas it requires. Anyone familiar with the Pisgah and Nantahala national forests will recognize the already very large road mileages with their attendant brushy edges, plus dozens of purposely created wildlife clearings.

The Sierra Club has supported the Bryant Bill now before Congress that would, if adopted, ban clearcutting and other forms of even-aged management on the national forests. However, there is no bill before Congress to ban all logging. We are talking commercial harvest here, not the establishment of wildlife clearings as needed to maintain the normal, native diversity of wildlife and vegetation in national forests. Be assured, if the ruffed grouse is threatened with extinction as is the northern spotted owl, the Sierra Club will fight just as hard for grouse and the habitat it needs.

National forests must be managed to promote a healthy functioning forest ecosystem that will be sustainable and self-perpetuating for generations, including being able to support all the wildlife and vegetation characteristic of such native forests. No one resource output, like ruffed grouse, bear, lumber or hiking trails, campsites, or even public access, should control forest management. We would give up our opposition to clearcutting if we could be convinced that our national forests were indeed being managed in this broader perspective with adequate scientific ecological input.

*—Bill Thomas*
*Forest Issues Coordinator*
*Sierra Club, N.C. Chapter*

*Second Record Fish for Angler*

## World Record Smallmouth Buffalo Landed from Lake Wylie

Tony Crawford has done it again. In mid-November, the Kings Mountain native landed an 88-pound smallmouth buffalo from Lake Wylie, breaking not only his own previous state record, but also two world records. In December 1991, Crawford caught a 61.02-pound smallmouth buffalo from Lake Wylie to set the state record for that species.

Crawford's 88-pound behemoth has been recognized by the National Freshwater Fishing Hall of Fame as the overall new smallmouth buffalo world record and as the smallmouth buffalo world record in the 12-pound test line category.

The 88-pound fish "buffaloed" the old world record, a 68.8-pound buffalo from Arkansas, by almost 20 pounds. The new world record was caught about midnight on November 14 on one of Crawford's home-cooked, garlic-flavored pack baits. The fish was 46 inches long and had a magnificent 40-inch girth. Crawford said the buffalo fought with a steady, hard pull. "It felt like I hooked a motorboat," he said. "It took about 25 minutes to land," adding, "and four people to carry it up to our trailer."

Crawford, who operates several commercial catch-and-release carp and catfish ponds in North and South Carolina, is a serious "rough" fish angler. "Catching a fish like this is not something you do by accident," he explained. "I fished the hole where I caught both record fish for over seven years." He has also developed numerous recipes for carp and buffalo baits.

Endorsements from fishing tackle sponsors have been coming in steadily since Crawford landed the fish. He is developing several recipes with one fishing scent manufacturer and several tackle companies have contacted him. He has also given seminars on rough-fishing tactics at regional boating and fishing shows.

Crawford said rough fishing is growing in popularity near his home. "Carp fishing is catching on like wildfire," he said. "It's hard for me to believe. We've even had people from as far away as Arkansas want to know more about it."

According to Crawford, the *Charlotte Observer* honored him by awarding him their 1993 Quote of the Year for his quip about catching the record fish: "It beats anything I've ever felt, helt or smelt."

Crawford releases almost all carp he catches into his commercial ponds, but he's having the world-record fish mounted. Two additional replicas of the fish are also being made, one for the Freshwater Fishing Hall of Fame and another for a fishing scent manufacturer.

LEM LYNCH

***Tony Crawford** of Kings Mountain landed this 88-pound smallmouth buffalo from Lake Wylie to set two world records and a new North Carolina state record for the species. Crawford also held the previous state record smallmouth buffalo with a 68-pound fish landed from Wylie in 1991.*

## National Wildlife Week Declared

The National Wildlife Federation has declared April 17-24 National Wildlife Week. The 1994 theme will be "Let's Clean Up Our Act: Pollution Solutions."

To promote and celebrate the week, the National Wildlife Federation and its state affiliates, including the N.C. Wildlife Federation, have distributed 600,000 education kits to educators for use in classrooms. Each kit contains a curriculum guide for grades K-8 and posters.

For more information or to obtain a kit, contact the N.C. Wildlife Federation, P.O. Box 10626, Raleigh, N.C. 27605, or call (919) 833-1923.

## Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before travelling to an event. Items for listing should be conservation-oriented and should be sent four months in advance.

**April 12-17**

The 24th annual Grifton Shad Festival will feature over 25 events. Most events will be held on weekend of April 16-17. For more information, contact Grifton Shad Festival, P.O. Box 928, Grifton, N.C. 28530, or call (919) 524-4356.

**April 23**

The state council of Quail Unlimited will hold a Sporting Clays tournament at Deep River Sporting Clays near Raleigh/Sanford. The funds raised will be used to support the N.C. Wildlife Resources Commission's youth hunter safety program. For more information, contact Russell Avery (919) 881-0972, or call Deep River Sporting Clays at (919) 774-7080.

*Volunteer Searchers Help Museum*

## Pliocene Whale Fossil Discovered in Halifax County

There are no weapons required for this type of hunting, for time and the elements have taken care of capture. In fact, no living animals are involved; instead, fossilized remains are the target for amateur fossil hunters. One of the most impressive trophies to be uncovered recently comes from Halifax County, where Rufus Johnson of Roanoke Rapids, an amateur fossil hunter, discovered a fossilized whale skeleton.

The whale was discovered last April by the fossil hunter, who also serves as a volunteer associate with the N.C. State Museum of Natural Sciences in Raleigh. After notifying property owners, he contacted the museum and excavation of the site began.

It is not uncommon to find fossilized whale bones in Halifax County, as well as other places in the state, according to Vince Schneider, research associate for the museum. "This discovery is significant because there are a lot of bones from the same animal—about 40 percent."

The whale, not yet identified as to species, was 50 to 60 feet in length. The whale lived in the Pliocene—about 4 to 6 million years ago—a time when the ocean extended along an ancient shoreline ridge where Interstate 95 is now located.

Schneider says that amateur fossil hunters are important to the museum, because there are too many miles of streams for one person, or even an entire staff, to search. "The amateur hunter is important only if he is out there helping by reporting finds to the museum," he added. Fossil hunters who want to share their finds can contact the Museum of Natural Science at (919) 733-7450. See David Lee's "Dinosaurs Down the Cape Fear" in this month's issue for more information.

—*Ginny Orvedahl*

GINNY ORVEDAHL

***Amateur fossil hunters** discovered a fossilized whale skeleton in Halifax County, which was excavated by the N.C. Museum of Natural Science. Pictured above is part of the whale's tail bone.*

*At N.C. State Fairgrounds*

## Save Our Sounds Coastal Celebration in April

A crowd of thousands is expected at this year's Save Our Sounds Coastal Celebration in Raleigh on April 16-17. The celebration is scheduled to be held at the Kerr Scott Building at the N.C. State Fairgrounds.

For the past five years, the Coastal Celebration has educated thousands of citizens about the state's coastal environment and the threats to it. This year's theme will be "Year of the Coast: For the Children."

In addition to boat building exhibits, arts, crafts and seafood cooking demonstrations, the Coastal Celebration will also feature numerous educational exhibits for children and students.

The Coastal Celebration is just one component of Save Our Sounds Inc., a comprehensive campaign designed to raise public awareness about North Carolina's coastal resources. Key components of the campaign include: "Troubled Waters" and "Troubled Rivers," two award-winning documentaries focusing on issues surrounding water pollution and protection in North Carolina's river and estuarine resources.

SAVE OUR SOUNDS INC.

***The Save Our Sounds** Coastal Celebration will feature educational exhibits such as this touch-tank, as well as other activities. The Celebration will be held in Raleigh at the N.C. State Fairgrounds this month.*

Save Our Sounds Inc. has also produced educational infomercials offering tips to viewers on how they can practice conservation. Another product, "Sound Advice," is an illustrated color guide of easy-to-follow recycling and water conservation tips and teacher resources. "School Outreach" provides educational materials and programs on various coastal issues.

Children will be admitted free to the Coastal Celebration and adults are asked to make a $2 donation at the door. For more information, contact Save Our Sounds, P.O. Box 12000, 2619 Western Blvd., Raleigh, N.C. 27605, or call (919) 821-8790.

*New "At Large" Record Set*

## Mackerel Caught Six Years after Tagging

A king mackerel tagged by the N.C. Division of Marine Fisheries over six years ago was caught in October by angler Jeff Oden of Hatteras. This set a new state record for the longest period between tagging and catching a king mackerel. The previous record was set by an angler who caught a mackerel that had been tagged five years earlier. Oden landed the fish off Hatteras Inlet.

Oden's king mackerel had been tagged and released off Beaufort Inlet in 1987. The N.C. Division of Marine Fisheries tags and releases certain fish species in order to obtain information on their movements. Since 1985, over 6,000 king mackerel have been tagged and released. The biologists record the tag number, length, date and release location and then compare the data with information gathered at the time of capture. By examining this information, scientists can determine migratory patterns, growth rates, principal harvest areas and fishing effort.

The majority of king mackerel tagged off North Carolina are recaptured off the state's coast. The Division of Marine Fisheries offers $5 for returned tags for three species involved in the tag-and-release program: striped bass, flounder and red drum. King mackerel tags are worth $10 or a cap. At the end of each year tag numbers will be entered into a drawing for a $100 prize in the striped bass, flounder, king mackerel and red drum categories. To receive any award, anglers must supply information on capture location, date, length and type of fishing gear used. Anyone who catches a tagged undersized fish may clip the tag at the base and release the fish alive. The tag will still be eligible to receive an award when it is mailed to the N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, N.C. 28557-0769, or call (919) 726-7021.

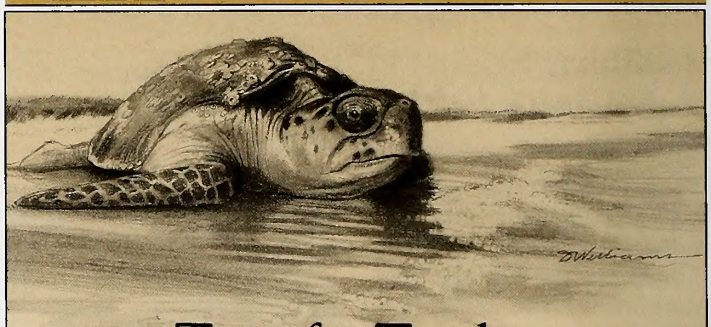
## Wildlife Endowment Fund Report

**January 1994**

Principal Balance
$19,225,950.16
Interest Earned
$13,166,273.12
Total Receipts
$32,392,223.28
Interest Used
$5,175,203.48
Fund Balance
$27,217,019.80

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Time for Turtles

*by Vic Venters*

Nesting by endangered sea turtles begins in earnest next month and will continue through mid-August. Consequently, the coming months are a busy time for the volunteers who assist the N.C. Wildlife Resources Commission's Nongame and Endangered Wildlife Program with its nest-management projects.

Since the nongame program has only two full-time staff biologists assigned to the sea turtle project, volunteer groups at selected beaches assist in counting and monitoring nesting efforts of loggerhead and green sea turtles each breeding season. These groups always need committed volunteers who can devote time on a regular basis to help monitor nests.

Volunteers for nest monitoring should be able to devote time on a daily basis during part or all of the nesting season and should be prepared for the training needed to work with animals on the Federal Endangered Species List. While not everyone can commit to these requirements, the nongame program always needs help with its sea turtle and stranding network. Those encountering a dead or beached sea turtle should report their findings to the Wildlife Commission or the Division of Marine Fisheries. Last year, there were 198 recorded sea turtle strandings on North Carolina beaches. Although counting and cataloging sea turtle carcasses is dirty—and sometimes gruesome—work, biologists can use these figures to estimate how many of the endangered marine reptiles are dying off the coast. There is a particular need for volunteers to report strandings on northern beaches from Nags Head to the Virginia line.

Fresh sea turtle carcasses found this year will be also used in an important project that will help biologists estimate turtle mortality in sounds. If you are interested in volunteering for either nest monitoring or for looking for stranded sea turtles, contact the Wildlife Commission's project leader at (919) 726-7157. Stranded sea turtles may also be reported to the N.C. Division of Marine Fisheries hotline at 1-(800)-682-2632. Another way you can help endangered sea turtles is by contributing to the Nongame and Endangered Wildlife Fund on your tax returns this year. For more information, see the address on the inside back cover.

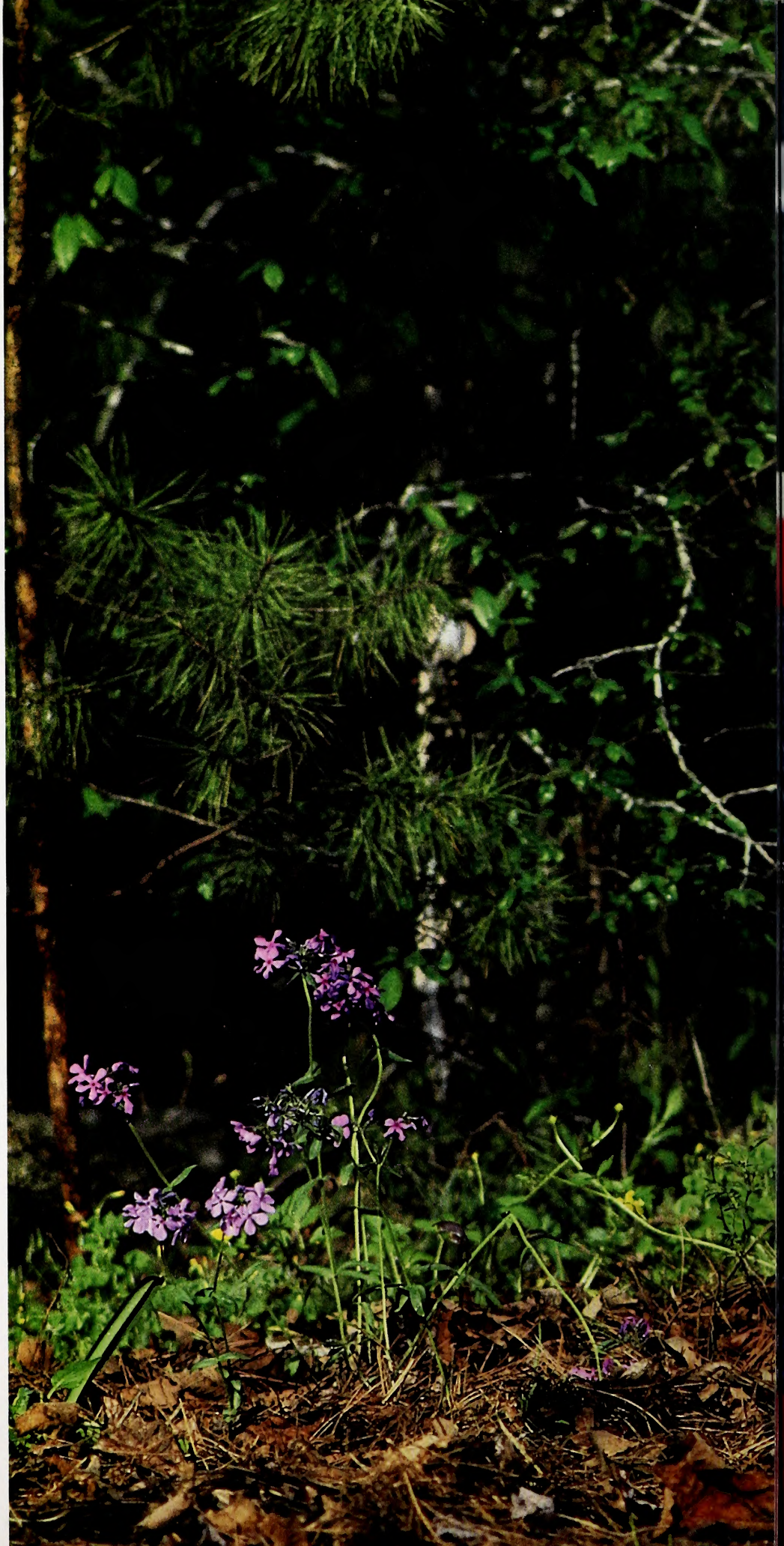
# Pretty in Blue

NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

Little blue herons are considered a species of special concern on North Carolina's list of endangered and threatened wildlife. Your tax-deductible contribution to the N.C. Nongame and Endangered Wildlife Fund can help the heron and other nongame animals.

Make your donation through the state income tax checkoff or directly to the Nongame & Endangered Wildlife Fund, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

KEN TAYLOR



## Looking for Love

In spring, a wild turkey gobbler's fancy turns to, well, you know. Gobblers aren't fools for love, however, and remain incredibly wary even when seeking a mate. The good news is that careful management has restored wild turkey populations throughout much of North Carolina.

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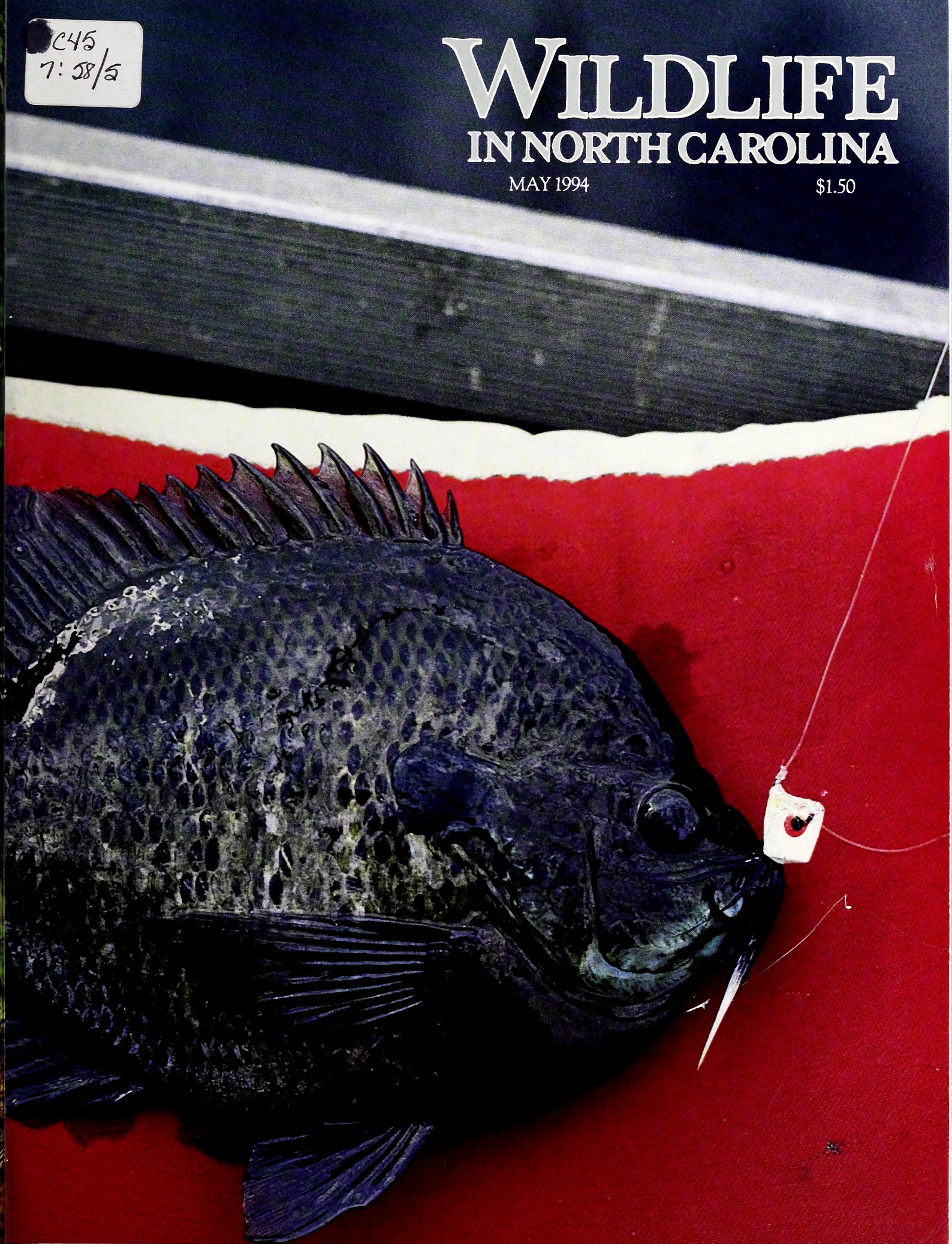

# Breaking In a New Guide

*by Jim Dean*

In the early morning, the cool night air would descend from the mountains around us, bringing with it the scent of fir trees. The aroma would linger—like Christmas in June—until the rising sun heated the sage-pocked Montana river valley along the upper Madison River and pushed the heady aroma back up the slopes. It seemed an especially appropriate salutation for each of the 10 days in 1986 we stayed in the cluster of lodgepole pine cabins called The Slide Inn.

From the porch of our cabin, we could look across the river to the wide gap in the mountains known as Raynold's Pass. Jim Bridger's men had camped there, and Indians long before him. From the looks of things, it could have been yesterday.

Susan and Scott loved The Slide Inn, partly because its name was so wonderfully low and sleazy and thus had predictable appeal for youth (Susan was but 17; Scott was 21). Actually the Slide was very comfortably rustic and took its name from Slide Lake just upstream where in 1959 an earthquake had caused an entire mountaintop to slide into the river, forming a large lake. From our base camp, their father was ostensibly introducing them to the glories of the American West. More precisely, he was making a return pilgrimage to fly fish his favorite trout streams in Montana, Wyoming and Idaho with two eager gillies.

JIM DEAN

*Susan Dean with Montana cutthroat.*

The fishing was varied, and often good. We waded the Madison and tried our luck on streams in Yellowstone National Park. On several days, we made junkets to fish for rainbows on the Henrys Fork of the Snake River in Idaho. By midweek, Scott had taken a dandy brown on a big nymph on a float down the Ashton to Chester stretch of the lower Henrys Fork, and Susan had fooled some nice cutthroats on tiny caddis in a headwater. Their already keen fly-fishing skills were being honed daily, but it was Susan who was to display them most memorably.

We had learned that the salmon flies—actually large stoneflies—were beginning to hatch as expected on the Madison, and on the day before we were to fly home, we waited at The Slide Inn for our guide to arrive. He pulled up driving a new red Audi and hauling the most expensive drift boat money could buy. Everything he owned was high dollar new, and he had an attitude to match.

"I wasn't told I would be carrying kids," he said, looking at Susan and Scott, though he couldn't have been more than about 25 himself. "I don't know about this, but if you can keep from hooking me on a backcast, we'll try it."

As we loaded our gear and launched the boat, he swaggered around sharing his superior knowledge of fishing and making disparaging remarks about our tackle. Susan shot me a sidelong glance. I could tell you the word that formed on her lips, but I think it best not to.

Our guide motioned me to get up front and fish. I shook my head and handed Susan the 8½-foot, 7-weight rod already equipped with a big stonefly nymph and strike indicator. Mister Personality would surely have paid dearly for a suit of armor, but he said nothing.

Susan jammed her legs in the supports at the bow and the boat swung into the current with the guide at the oars. As we bounced down the swift current and slid past huge boulders steaming in white water, the guide began to shout orders. Susan ignored him as she faced the bank, made a couple of deft double-hauls and shot 70-feet of line to a glassy boil next to the bank. As the current swept the line downstream, she expertly threw a long mend upstream. Lefty Kreh couldn't have done it better.

The guide looked as though he'd been gut-shot. I glanced at Scott who wore a curious smile and seemed to be intently studying the clouds.

"Ah, don't worry, you'll get the hang of it," I said to Susan.

"Yeah, gotta watch those tailing loops beyond about 80 feet," she answered as she made another superb cast, adding a sophisticated mid-cast mend.

The advice from the rowing seat fell off sharply as we swept down the river. Moments later, the strike indicator dipped and Susan set the hook into a big rainbow. By the time our guide had slipped the net under that fish, he'd fallen in love. It was a miraculous transformation. The swagger was gone and the advice was tempered. We were four fishermen on equal footing sharing a rare moment of privilege on a wonderful river.

Susan caught the biggest rainbows, and the most, but Scott and I did well enough. We left the guide a nice tip—he'd earned it—and a promise to fish together again. It had been a grand day, and valuable lessons were learned all around. Even so, when we flew home the following day, only one "kid" had the guts to wear his Slide Inn T-shirt. Care to guess who that was?

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **Bream Every Which Way**
*written and photographed by Gerald A. Almy* © 1994
*Bait, lures and flies all work great for bluegills and shellcrackers this time of year. Here's all you need to know to launch a triple threat.*

8 **Woebegone Warmouths**
*written and photographed by F. Eugene Hester* © 1994
*What attacks like a leopard and fights like a leaf? Ah yes, t'is the Rodney Dangerfield of fish. Yet, even the warmouth has its admirers.*

12 **Whales on the Beach** *written by David S. Lee* © 1994
*illustrated by Patricia Savage* © 1994
*Anytime a creature as big as a whale comes ashore, people notice. And they can't help wondering why it happens.*

20 **Oh Say Can You See...** *written by Deborah Wechsler* © 1994
*illustrated by Jackie Pittman* © 1994
*...any red bugs on me? If you do, pick a few.*

24 **Boy Scouts Go WILD** *written by Mike Campbell*
*photographed by Ken Taylor*
*It's a great matchup when Project WILD goes to camporee with the Boy Scouts of America.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

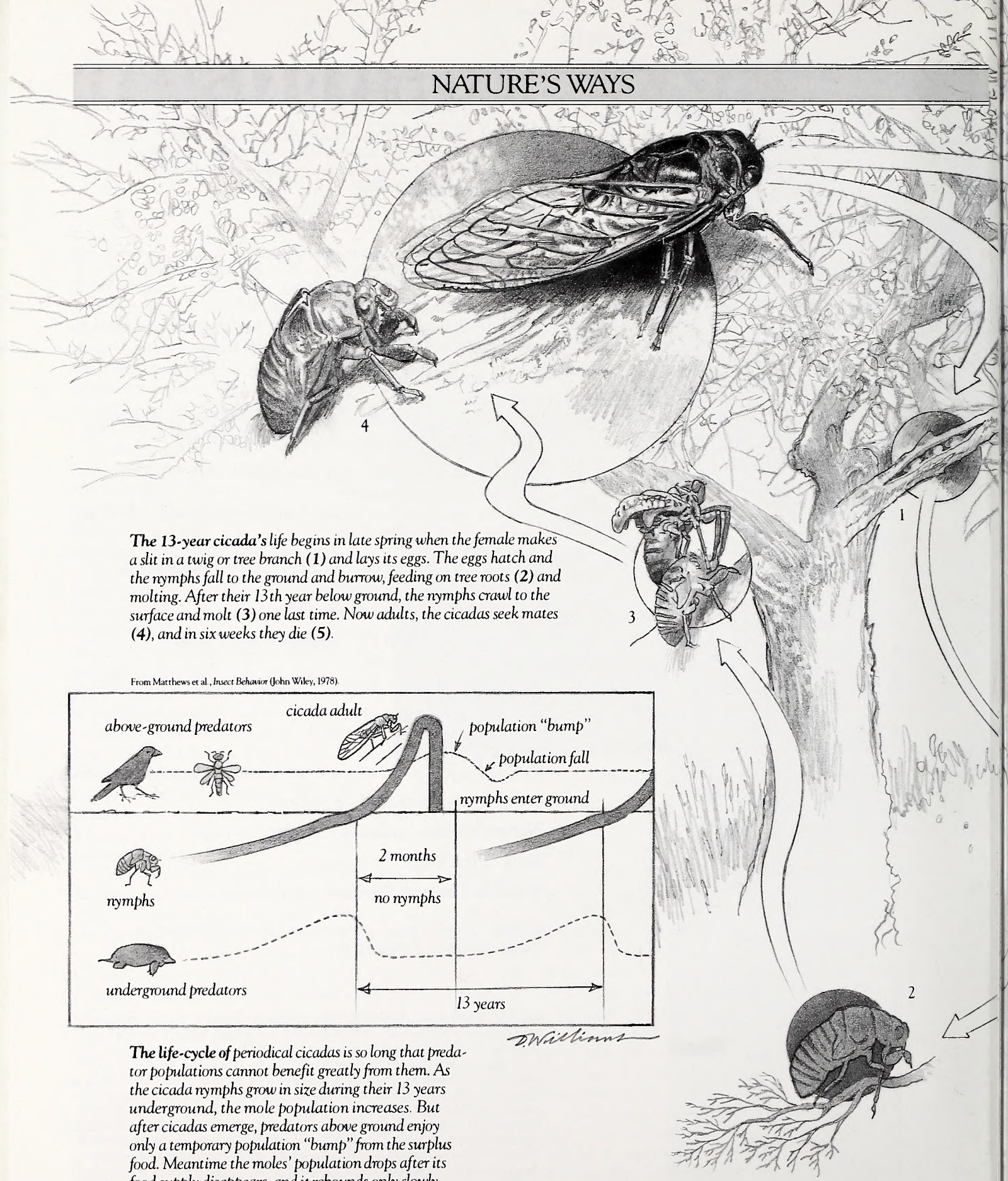
**Nature's Ways** *by Lawrence S. Earley*

**Back of the Book** *by Vic Venters*

**Wildlife Through the Year** *by Vic Venters*

**Cover** *This fat bluegill was caught on a fly rod and popping bug. Photographed by F. Eugene Hester.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**




***The 13-year cicada's** life begins in late spring when the female makes a slit in a twig or tree branch **(1)** and lays its eggs. The eggs hatch and the nymphs fall to the ground and burrow, feeding on tree roots **(2)** and molting. After their 13th year below ground, the nymphs crawl to the surface and molt **(3)** one last time. Now adults, the cicadas seek mates **(4)**, and in six weeks they die **(5)**.*

From Matthews et al., *Insect Behavior* (John Wiley, 1978).




D. Williams

***The life-cycle of** periodical cicadas is so long that predator populations cannot benefit greatly from them. As the cicada nymphs grow in size during their 13 years underground, the mole population increases. But after cicadas emerge, predators above ground enjoy only a temporary population "bump" from the surplus food. Meantime the moles' population drops after its food supply disappears, and it rebounds only slowly because the new generation of nymphs has little food value at first.*

# The Longest Wait

*written by Lawrence S. Earley/illustrated by David Williams*

You won't see them this May, at least not the "Great Southern Brood," as they are sometimes called, the ones that seem almost like a Biblical plague with their awesome numbers, their noise and the dried skins they discard. Indeed the 13-year cicadas won't appear next until 1998.

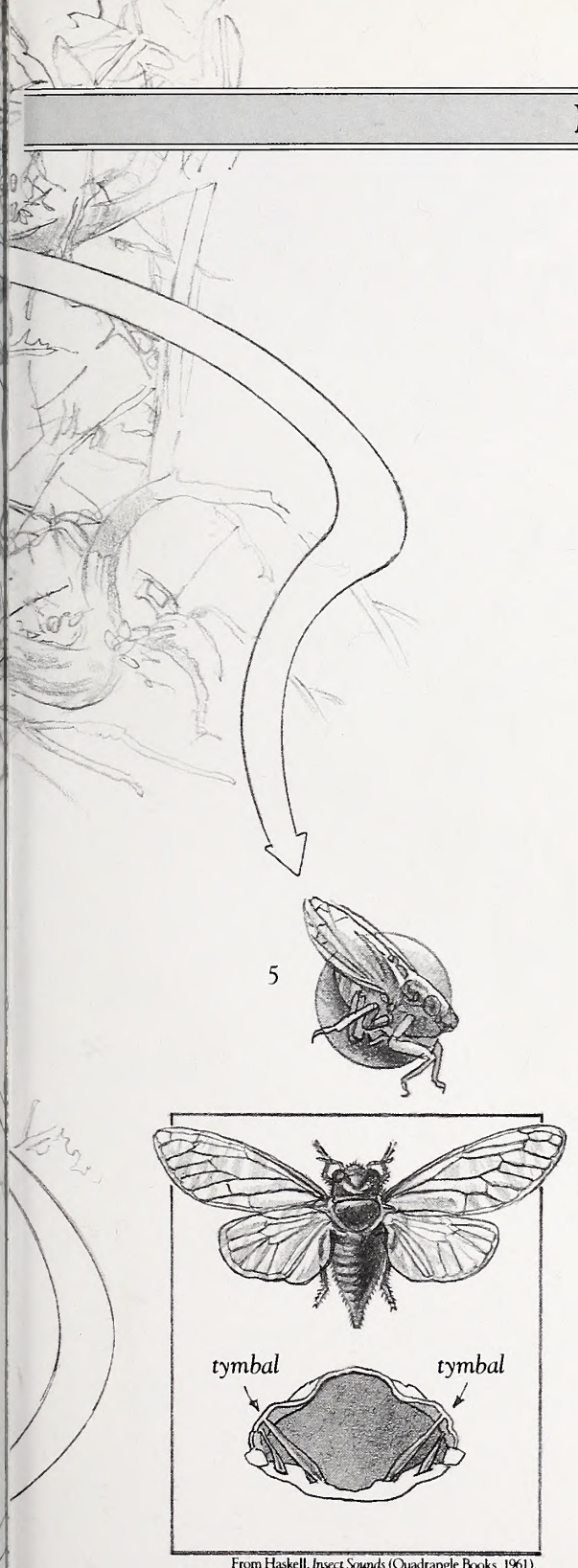
That's 13-year or 17-year *cicadas*, not *locusts*. Many people get cicadas confused with the voracious migratory locust—a relative to the grasshopper—that strips fields bare in Africa and the Middle East. And don't confuse the periodical cicada with the annual cicada. Annual cicadas are predominantly black and are larger than periodical cicadas. They emerge throughout the summer, which is why they are sometimes called "dog-day" cicadas, and their life cycle is unknown although some may appear every year. Periodical cicadas, on the other hand, have red eyes and reddish-orange wing veins and body markings, and they emerge in spring in two different cycles—one every 13 years and another every 17 years.

For many years, entomologists thought that the periodical cicada was a single species, but now we know that there are six species—three 13-year species and three 17-year species—that emerge in "broods." A brood consists of all the 13-year or 17-year cicadas that appear in a particular year in a particular location. Brood I, for example (broods are identified by Latin numerals), is a small brood that encompasses an area from southeastern Pennsylvania, Maryland, northwestern West Virginia, Virginia and western North Carolina. As many as 30 broods have been identified, although there are probably no more than 18. Almost every year a brood or several small broods emerge somewhere in the eastern United States, but there are major broods as well. In the South, the major brood is Brood XIX, the "Great Southern Brood." This is a 13-year cicada that last appeared in 1985 and thus will appear next in 1998.

The life history of periodical cicadas involves a lengthy subterranean development and only a cameo appearance topside. In 1985, the females of Brood XIX laid about 400 to 600 eggs apiece in slits they made in the twigs of trees and shrubs. In six or seven weeks, the nymphs hatched and dropped to the ground, burrowing about 2 feet deep to find roots to feed on. That's where they are today, although they've molted several times since then and have grown larger. They'll stay underground for another four years and then climb to the surface for a few weeks of sunlight and media attention. Climbing up into trees, they'll split their nymphal skins and molt for the last time. Within a week, the cicadas will mate; in seven to 10 days the females will lay their eggs; and at the end of five or six weeks, all of them will be dead.

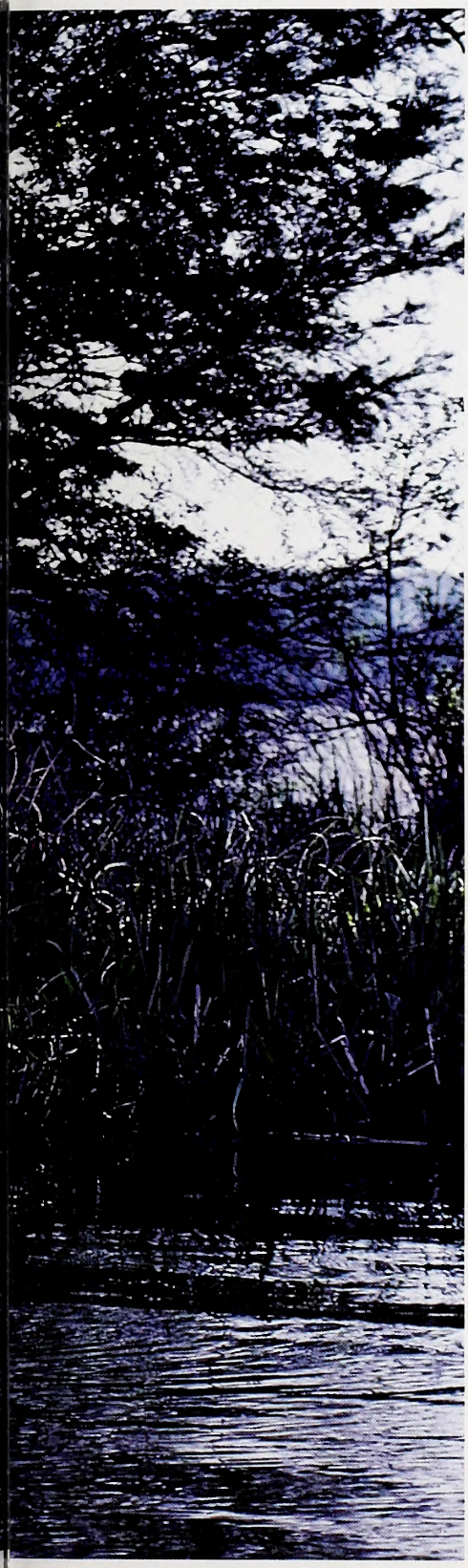
By confining themselves to sometimes spectacular mass emergences that are separated widely in time, cicadas probably derive several benefits. For one thing, looking for mates is a lot easier when everyone's there at the same time. Also, a cycle that lasts 13 or 17 years is so long that predators cannot adjust their own population numbers to take advantage of all the food. The sheer number of cicadas defeats the abilities of birds and other predators to consume them all.

Though you can't see them, they are nonetheless just below the surface. Fully grown even now, they await the mysterious signal that is still years away, the one that will prompt their upward migration and their brief life in the sun.




From Haskell, *Insect Sounds* (Quadrangle Books, 1961).

**Cicada sounds** *are produced by a pair of structures called tymbals, membranes in the abdomen that are normally bowed outward. When muscles attached to the tymbals are contracted, the membranes pop inward with audible clicks. When the muscle is relaxed, another click occurs. Cicadas can contract these muscles almost 500 times a second, producing a deafening stream of sound.*



***During their first spawn,*** *usually in May, bluegills and shellcrackers often fan out their circular beds in very shallow water near the bank (above). The fish are aggressive when they're guarding the beds, and they eagerly attack any floating popper or sponge spider (opposite).*

# Bream Every Which Way

## Bait, lures and flies all work great for bluegills and shellcrackers this time of year. Here's all you need to know to launch a triple threat.

written and photographed by
Gerald A. Almy ©1994

Shrouds of white mist curled above the water's surface as we launched the old wood fishing boat, cranked up the 10-horsepower outboard and cruised across Lake Gaston toward a secluded cove on the opposite shore. Bass and stripers had often drawn me to this big lake in the north-central part of the state, but today a different quarry was on the agenda—the humble bream.

Cutting the motor, my partner picked up his paddle and sculled us the final few feet to the edge of a shallow bay where we could see soft, scoured-out circles dotting the bottom through the emerald water. While he cast a tiny grub on a light spinning rod, I flipped out a sponge rubber spider. In minutes we were both laughing as heavy bluegills raced through the clear cove waters and strained our light outfits. While there were a few lulls, most of the next three hours were spent missing strikes or hooking up and fighting these scrappy panfish. By late morning, when we decided to turn our attention to bass, we had landed dozens. We released most, but iced down enough for several tasty meals.

When dogwoods blossom on hillsides and ruffed grouse fan the air from their drumming logs, angling reaches a fevered pitch all across North Carolina. But in the rush to seek out glamour species like trout, bass and stripers, it's important not to forget the humble bream. Bluegills and redear sunfish (shellcrackers) will be swarming in the shallows over the next few months feeding and spawning. And there's no finer time to seek out these colorful, hard-fighting fish than now when they're schooled up tight in thin water enacting the rites of spring.

If you've been snubbed by finicky bass or lacked just the right fly to fool a difficult brown trout, these fish offer the perfect antidote. With the right tactics and tackle, bluegills and shellcrackers are easy to catch. You'll typically count your haul in the dozens, whether you release them or keep a few for a fish fry.

The fact that they're not difficult to catch makes them a great quarry for introducing novices to fishing. And their prolific breeding habits make them the perfect target if you like to keep some fish to eat. With bass and trout, the catch-and-release ethic is so engrained we almost feel guilty every time we slip a fish in the creel or onto a stringer. Bluegills and redears, on the other hand, thrive where they are regularly thinned out (within reason). Keep what you can eat and chances are you'll help, rather than hurt the fishery.

Bluegills and redears tend to attract "specialist" fishermen. One angler will use nothing but red wrigglers, another is an ultralight lure fanatic, the next a fly-fishing purist. The fact is that all of these techniques will fool shellcrackers and bluegills in spring, but the angler who is truly ready for any situation will have at least two of these methods at his disposal, preferably all three. Sometimes one approach will be more productive than the

***Though fly fishing** for shellcrackers and bluegills is lots of fun, small lures and spinners or bait on light spinning tackle are also very effective. Shellcrackers are a bit less likely to rise to the surface to feed than bluegills, perhaps because aquatic insects and crustaceans are their favorite foods.*

other, and it keeps fishing more interesting if you don't always use the same tactics and tackle.

Before going into specifics on fishing for bream with lures, bait and flies, a look at where to find them in spring may be helpful. When you mention sunfish most people immediately think of farm ponds. These are definitely a prime choice, though you may have to try several before you find one that's truly a well-balanced bluegill and shellcracker spot with fish weighing half a pound or more. Slow-moving rivers are another possibility that often get overlooked. Weedy backwaters and deep, slow-moving pools, particularly in rivers flowing through the eastern half of the state, can provide fine sunfishing. Finally, don't ignore the larger lakes and impoundments throughout North Carolina. Bass, stripers and catfish get hammered in these big waters, but populations of bluegills are often almost totally neglected.

It takes a bit of searching to find them, but once you pin down specific areas in these large bodies of water where bluegills or redears breed, they'll produce year after year. In May and June, most fish will either be spawning or hovering near their mating areas. Check out the feeder arms of the lake and then search for coves with gravel or sand bottoms, if available.

If the water is clear, you can often see the donut-shaped beds in the shallows anywhere from 1 to 5 feet deep with fish hovering over them. Sometimes, I've also located beds by smelling them. It's sort of a combination fresh fish-cantalope aroma. This is particularly useful if the water is too murky to see the beds. If fish aren't actively spawning, you may have to probe slightly deeper water nearby, concentrating on weeds, stumps, brush piles, dock pilings and drop-offs.

Bream aren't as skittish as a native brookie, but you can't bang paddles against the gunnel, scrape tackle boxes and anchor right over top of them, either. Stay 20 to 40 feet back from the beds or the area where you suspect the fish are holed up, and try to avoid any sharp noises.

Tackle for bait fishing also serves double duty for lures. A light or ultralight spinning rod of 5 to 6½ feet and a small open-faced reel spooled with 2- to 6-pound mono is best. A spincasting outfit also works well for young anglers. Avoid getting a rod that's too whippy and soft-actioned.

Terminal gear consists of a bag or two of small split shot, size 6 or 8 long shank fine wire hooks and several floats. You can use regular bobbers, but the sensitive European versions such as those made by Wazp and others are especially useful when going after spawning bream since bites are sometimes hard to detect and the fish may spit the bait if they feel too much resistance.

The top offerings for spring redears are earthworms, red wrigglers or a piece of nightcrawler. These are also excellent for bluegills, coming in a close second behind crickets. Adjust the float so the bait hovers a few inches off the bottom, with one or two split shot crimped a foot up the line for weight.

Cast this rig out to beds you've spotted or areas where you've smelled fish or caught them before and know they like to spawn. On the first few deliveries, fish will likely nab your bait the second it touches down. Then they'll grow a bit more skittish and wait longer between hits. Finally you'll reach a point where the bait will have to be delivered precisely inside a bed and allowed to sit there until the fish becomes aggravated enough to strike it and try to remove it from the spawning area. When this happens, if you have the option, it pays to move to another spawning area and rest those fish or take a break and try to catch a few bass for a while. An hour's rest will allow the fish to become aggressive again.

The same tackle used for bait fishing works well for lures. The only stipulation is that the rod should have a bit of backbone to it with most of the flex in the tip. This way you can

***Wading is a great way** to catch bedding bluegills and shellcrackers in the spring because the fish are concentrated and you can often stand in one spot and catch dozens. Fishermen who wade are also less apt to spook fish.*

set the hooks firmly, yet the flex in the end of the rod allows it to give slightly when the fish strikes so it doesn't immediately feel resistance and drop the lure. Light-action rods are often best, though a few ultralight versions are stiff enough. Line should be a 2- or 4-pound test. If snags are abundant, 6-pound test may be better.

Lures are particularly useful when fish are in the shallows feeding and getting ready to spawn, or when they're spawning in deep or dingy water. They're less effective when fish are hovering over beds in thin, clear water.

Small spinners, spoons, spinnerbaits and miniature crankbaits such as those made by Rebel can all be effective on either prespawn bluegills hovering in backwaters and coves, or on fish mating in 3 to 6 feet of water. Cast and retrieve them as slowly as you can and chances are you'll pick up a number of aggressive fish this way, particularly males.

The very best lure for spring sunfish, however, is the grub. A tiny leadhead weighing 1/32- to 1/8-ounce with a soft plastic body is effective on both prespawn and bedding fish. Twister-tailed versions work at times, but shorter compact versions with stiff, stubby tails and less action are usually best. Cast and retrieve these as slowly as you can near fish you can see or in promising areas, pausing occasionally to let the lure drop back deeper, even into the bed. Takes will be delicate, almost imperceptible. Set the hooks at the slightest different feel as you work the lure back.

If the action slows, snap a small float on the line so the lure suspends at the fish's level and let it hover motionless over the beds. That's usually too much for the protective bream to tolerate.

There's no finer time to catch bluegills and redears on a long rod than spring. When the fish move into the shallows to feed or scour out their beds and breed, they're in the perfect zone for flies. A rod of 7½ to 9 feet for a 4- to 6-weight line is perfect for bluegills and shellcrackers. Use a light single action reel, a weight-forward line and 7- to 9-foot leader tapering down to a 3- or 4-pound tippet.

Trout flies work well on sunfish and I've had excellent luck with patterns such as the Wulff, Irresistible, Humpy, Adams and various terrestrials in sizes 10 to 14. When fish are slightly deeper or reluctant to rise to the surface, small buggy-looking nymphs and wet flies are deadly. The new bead-head patterns are particularly good.

But unless you're going after heavily pressured fish, you can usually leave these trout flies stashed away and simply take out a box filled with sponge rubber spider flies in sizes 8 to 12. Green, yellow, black and white are my favorite colors. When fish tire of striking on top or are holding deep, simply crimp on one or two tiny split shot a foot up the line and work the spider back with a slow, hand-twist retrieve 3 to 6 feet deep.

When the fish are in the shallows and taking on top, the less movement you impart to sponge spiders, the better. I've often suspected I could simply cast them out, wait patiently for a strike, then recast a minute or two later and catch more fish than I do by moving the fly. But it's hard to resist giving the spider a slight nudge or two after it sits for 10 or 20 seconds. If nothing grabs it after that first nudge, recast to a fresh spot.

No, they won't pull like a 10-pound striper or challenge you like a wary stream-bred trout, but bluegills and redears offer plenty of other attractions that make them rate high on my list for spring fishing. They're plentiful, good to eat, underharvested, tough fighters and equally willing to take lures, flies and bait. That's a combination that's hard to beat.

# Woebegone WARMOUTHS

What attacks like a leopard and fights like a leaf? Ah yes, t'is the Rodney Dangerfield of fish. Yet, even the warmouth has its admirers.

written and photographed by
F. Eugene Hester © 1994

In almost every millpond and warm-water stream in the state there is a special sunfish that lives among the stumps, logs and weeds. This pot-bellied, big-mouthed fish is called a "warmouth." You may also hear it called an "open-mouth" or "goggle-eye"—or even some less complimentary term. Alas, this interesting fish doesn't always get a lot of respect.

I'll admit that most warmouths are caught incidentally while fishing for some of its better-known relatives—bluegills or shellcrackers, particularly. But there are some of us who are fascinated enough by this fish to specifically seek it out—we go where it lives, fish at the right time of year and use the baits it likes best. When conditions are right we catch a lot of them.

One of my favorite places for warmouths is a sluggish stream that I can slowly drift in my johnboat. I fish among logs, stumps, lily pads or other aquatic vegetation. Other

***Like some people** we all know, the warmouth is notorious for its big mouth and bravado. These panfish are almost always willing to bite a cricket (above) or a popping bug (right).*

***Though most warmouths** run rather small, they can grow fat in some eastern rivers and blackwater ponds. The warmouths on this stringer are bigger than most and will make a tasty meal.*

equally good places are millponds, especially those with a lot of cover. Usually warmouths are found in shallow water and often in places only a foot or two deep. Another great place to find warmouths is in beaver ponds. Beavers seem to create just the type of habitat the warmouth needs. That means shallow water with lots of cover.

The warmouth has a lot in common with its other sunfish relatives, but it has its own habits and personality. Its pectoral fins are short and rounded and the anal fin is small compared to the dorsal fin. Several dark bands may be seen radiating backward from its eye across its cheek. The color of the fish varies with the water in which it lives, but in most waters, the warmouth has a golden, greenish-brown coloration with a mottled appearance to its sides and back, blending to a creamy yellow on the belly. In the coffee-colored waters of many millponds and coastal streams the fish are very dark, almost black. Some scales scattered across their flanks are lighter in color and may appear as chartreuse speckles.

The best all-around bait for a warmouth is a tiny crawfish only an inch or two in length. It is a natural food for warmouths and one of its most frequent food items. To get crawfish for bait, I seine little cow-pasture streams or roadside ditches. Small creeks and marshes are especially productive. Larger creeks usually support predatory fish and birds that will already have eaten most of the crawfish. A small, shallow wet spot, maybe even only a seasonal one, will sometimes hold crawfish and create an ideal breeding and growing place.

Since crawfish can be difficult to find, a more common bait that is still effective is a cricket. Crickets are available from bait dealers, and earthworms and small minnows work well, too. But regardless of what bait is used, it must be placed at the right place, at the right time.

The right place is where the warmouth lives and knowing that with some precision really helps. Dangling that bait a few inches in front of the warmouth's nose is a sure-fire way to get its attention. The closer you get the bait, the more likely the fish is to take it. The warmouth does not prowl around scouting for food. Instead it tends to find a nice home spot, perhaps between two stumps or sunken logs, and it remains there and waits for food to come crawling or swimming by. Last season when I cleaned several fat warmouths, I opened their stomachs to see what they had

been eating. One had two tiger beetle larvae and three grass shrimp and another had a dragonfly nymph. The third fish had two crawfish and one small sunfish. Clearly, warmouth eat a variety of foods.

In addition to live baits there are some artificial ones that can be great. One is a small 1- or 2-inch curlytailed grub or plastic worm rigged just as you would a miniature bass worm. I have found it especially effective to rig a 2-inch curlytailed grub Texas-rigged on a size 6 hook (the hook is threaded through the head of the worm, then pushed outside and turned back into the body of the worm, thus making it weedless). Because this lure is so small and light, I like to add a 1/32-ounce bass worm weight to the line a few inches ahead of the grub.

When fished with a light or ultralight spinning rod, this little grub can be cast into the heavy cover where warmouths live. The weedless grub slides across logs or among lily pads, and the curly tail has a lifelike, wiggling action as it moves along.

Fishing with live bait or plastic grubs can produce a lot of warmouths, but there is one method I like even better—fishing with a popping bug on a flyrod. I like to use an 8½-foot flyrod with a size 7 or 8 weight-forward floating fly line. I add a 6-foot monofilament leader and a small cork popping bug with rubber legs. A popping bug dropped into little openings in vegetation and twitched to add lifelike motion makes an irresistible lure. In shallow water, I can sometimes see a very slight wake as the warmouth swims toward the lure.

The warmouth is an interesting fish. At times it is aggressive, but at other times it is uncooperative. The single biggest factor affecting its activity is water temperature. In spring, they are one of the last of the sunfish species to become active and aggressive. Thus, it is often May before the water warms enough for us to catch many of them. Even then, an outbreak of colder weather, and especially rain, can cool the water enough to cause warmouths to stop feeding for several days.

Once warmouths start nesting, they become very active and more aggressive. But they also become more wary, too, and they are easily spooked. If not frightened, however, they will vigorously attack any critter approaching the nesting area. For this reason, fishing is rarely more successful than at the peak of nesting season.

Where I fish, I have found two nesting patterns. Sometimes warmouths nest singly, usually right up against shoreline vegetation in water only 6 to 12 inches deep. At times, I can find one of these nests at about 50-foot intervals along a good shoreline. Usually these nests will be obvious in that there will be a cleared area about a foot in diameter in front of a clump of needlerush or other shoreline vegetation. You can often see the waves made by a fish as it swims over this cleared nest.

At other times warmouths nest in groups more like bluegills, and there may be a dozen or more nests in a general area, but not quite as tightly clustered as bluegills. These nests are usually in shallow water and, like bluegills, the warmouths often swim rapidly over the nests, creating waves that make them easier to spot at a distance.

Water lilies provide ideal places for warmouths to hide and feed and this is one of my favorite places to look for them. Sometimes I drop the lure right into the middle of the lily cluster; at other times I place the bait in little openings or passageways among the lily pads. Another great approach is to fish along the outer edge of a clump of lilies. Lilies growing alongside a drop-off such as a creek channel provide one of the most productive spots. Warmouths apparently like to hide in the lilies and wait for a crawfish, insect or minnow to swim by. When fishing in blackwater streams, I especially like to drop a bait or lure between cypress stumps or logs near shore. Tree roots or log jams in shallow water can also be productive places.

The warmouth will usually engulf a lure or bait in one swift gulp. With that big mouth it seldom misses. Indeed, its mouth is about the size of that of a comparably sized largemouth bass, and it strikes with much the same vigor. Lots of anglers are fooled into thinking a warmouth is a bass, but the macho image is soon over. After the strike and an initial surge, the warmouth completely gives up, often turning on its side and sliding on the surface to the boat. In fact, it's this characteristic that causes some fishermen to dislike the warmouth.

Even so, on more than one occasion the warmouth has saved my fishing trip by being cooperative when the bass I originally sought all seemed to have lockjaw. On one trip, my fishing buddy and I had tried since dawn to catch largemouth bass. We had cast surface plugs, diving lures, plastic worms and about everything else in our tackle boxes without success. Around noon when we stopped by the boat dock for lunch, we spoke with other fishermen. Some cane-pole fishermen had been having great success fishing for warmouths. After a quick look at their stringers of warmouths, we immediately abandoned our bass lures and went after warmouths with crickets. They saved that day for us, and they've saved many others.

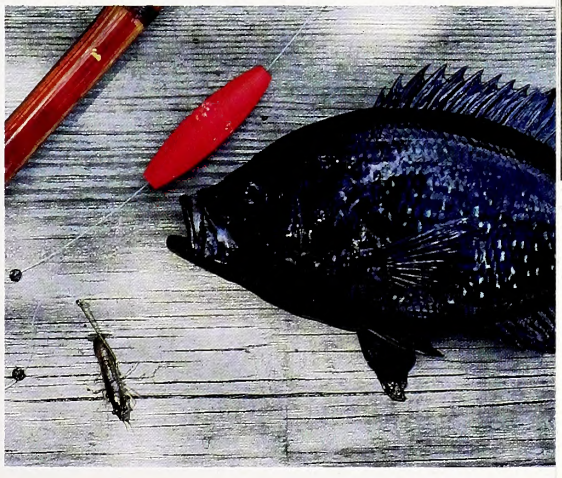
Years ago my fishing companions and I speculated whether it might be possible to catch an individual warmouth more than once in a day. One day I found a large warmouth nesting in shallow water along the dam in my dad's farm pond. The popping bug I cast over the nest was quickly attacked by the warmouth. Before releasing him, I clipped his third dorsal spine with my fingernail clipper.

Later that day I saw the fish again in its nest. When I cast the popping bug over it, the fish approached and watched it, but it was wary and refused to take it. I picked up a cane pole and dangled an earthworm near the nest. The warmouth took the bait and I verified that it was, indeed, the same marked fish. I again released the fish, but it was noticeably more wary. Yet, when I dropped a small minnow in front of the same fish late that afternoon, I caught and released it the third time in one day.

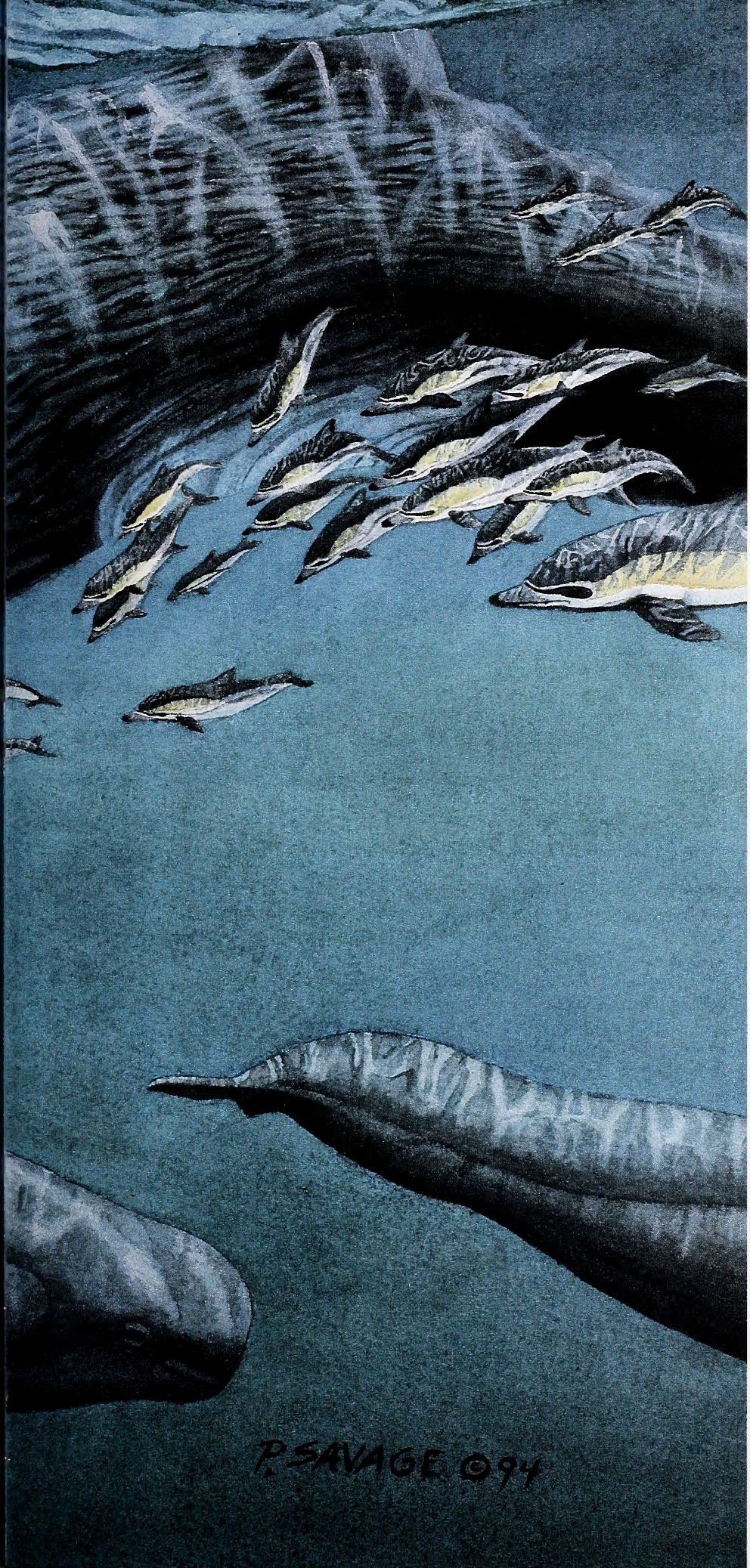
My brother William and I discovered an interesting warmouth behavior while fishing with minnows for bass and crappies. While the minnow swam 2 or 3 feet deep, the red cork bobbed on the surface. Sometimes a fish struck the cork. We found we could catch that fish by moving the cork down the line to position the minnow only a few inches underneath the cork. When we dropped the bait back in the same location, the fish struck the minnow instead of the cork. Almost invariably, the fish was a warmouth.

The warmouth is no glamour fish, and it's certainly not a fighter. It never leaps like a largemouth bass or plays tug of war like a channel catfish. In fact, it usually rolls over and gives up. But they strike like they mean business, and they're willing to take a variety of baits and lures. Often they are cooperative when other species are not, and they're plump and tasty. To my thinking, they're just as good to eat as any other panfish.

That's reason enough why warmouth will always have a place on my stringer and in my frying pan. ☐



***Warmouths eat** a wide variety of foods, but one of their favorites is a small crayfish. Grass shrimp are also excellent, but the angler will probably have to seine either of these from a small creek since most bait shops don't sell them. Crickets are a good substitute.*




YEAR OF THE COAST

# Whales on the Beach

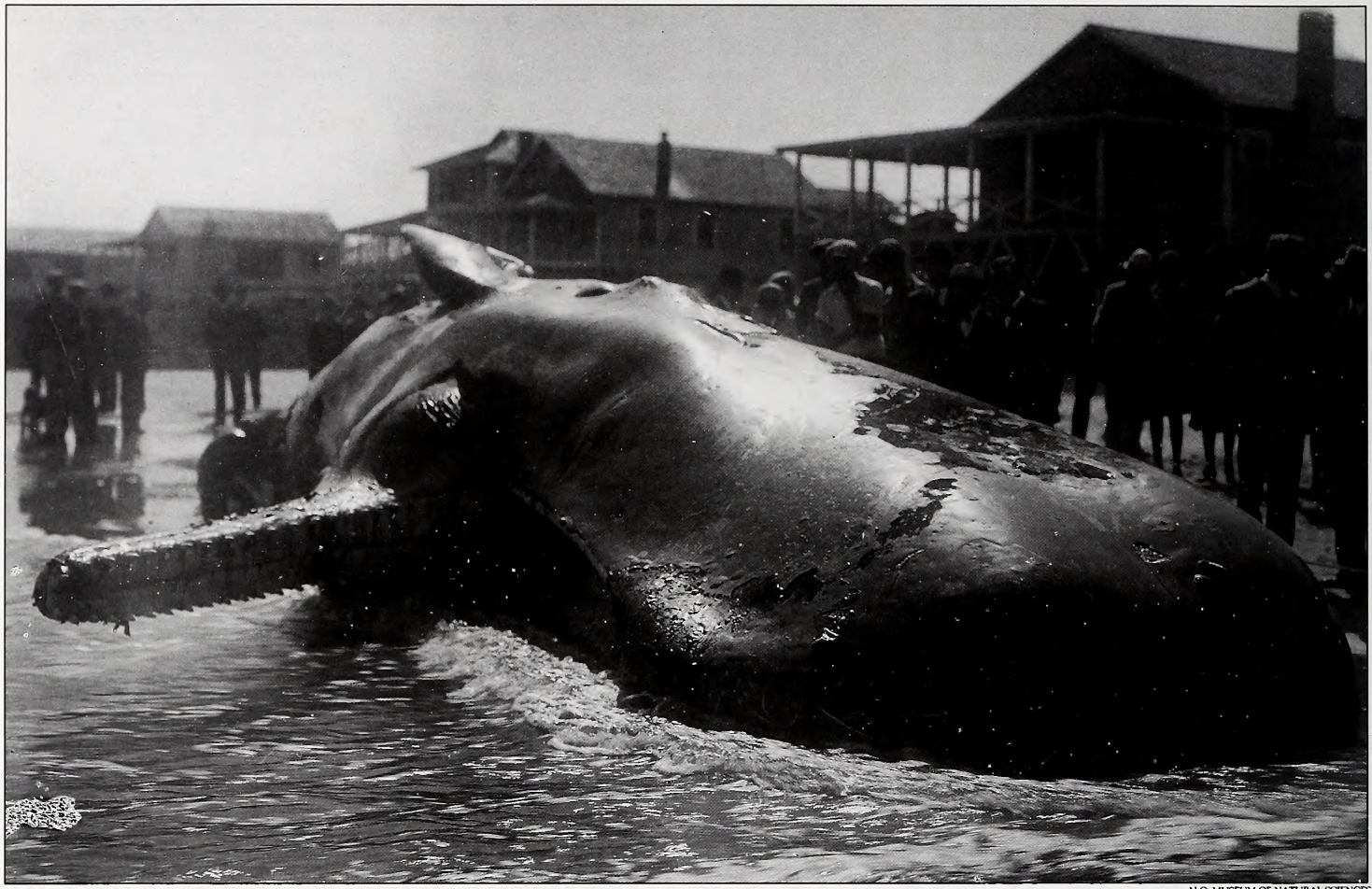
Anytime a creature as big as a whale comes ashore, people notice. And they can't help wondering why it happens.

written by David S. Lee © 1994
illustrated by Patricia Savage © 1994

From the distance they look like logs floating in water—huge logs. But these logs have big foreheads and they are all facing the same direction, evenly spaced, backs and dorsal fins exposed, reflecting black in the sun and air. I recognize them right away. They are short-finned pilot whales.

The whales permit us to bring the boat slowly alongside. The nearest one rolls just enough so that it is looking up at me, its eye round, dark and unblinking. Although short-finned pilot whales are common in North Carolina's offshore waters, they seldom behave so cooperatively. I want to reach over and stroke the melon-shaped head of the closest one, but the distance is just about a yard farther than I can reach. So we just stare at each other, and then without effort

***The huge bulk** of the sperm whale dwarfs the smaller short-finned pilot whale and common dolphins, three marine mammals that frequent North Carolina's waters.*



N.C. MUSEUM OF NATURAL SCIENCES

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***This dead sperm whale*** *floated onto Wrightsville Beach on April 6, 1928 (above and below). Because of recorded occurrences like these, North Carolina has the largest documented marine mammal diversity in the hemisphere. Temperate, boreal and tropical species all use our waters, and two oceanic currents—the Gulf Stream and the Labrador Current—transport many species to local waters.*

or sign of alarm she descends, and in the clear water I watch the dark form slowly disappear beneath the boat.

Seeing a pilot whale eye-to-eye is an exciting experience for a naturalist whose family once was involved in the whaling trade. Of the 27 marine mammals that are known to frequent the offshore waters of North Carolina, pilot whales and sperm whales were among the most heavily hunted by the whaling industry. Nineteenth-century whalers called pilot whales "potheads" because they had bulbous heads filled with 20 to 25 liters of very fine oil that was used as a lubricant in watches and other items with delicate gears. The flesh was salted and later traded for fresh food during the long voyage. Whalers from New Bedford, Mass., and other North Atlan-

tic whaling centers would harvest the summer herds that populated the outer continental shelf of North Carolina. Detailed harvest records are few. Whaling vessels did not wish to share the location of productive areas with others, and from ship's logs we can learn the volume of take and little else.

The Hatteras grounds, however, were well-known to New England whalers as an ideal hunting ground. En route to the lucrative Pacific and Indian oceans, captains could stop and give untested crew members the opportunity to practice the basics on pilot whales. Manning the small chase boats and positioning them for the kill required precise timing and teamwork. Stalking the highly prized sperm whale was a profitable but risky business, and captains could not afford an inexperienced crew.

Eventually it became known that the Hatteras grounds also had a small resident stock of sperm whales. They too were heavily exploited by the New Bedford whalers. Members of my family, six generations back, were whalers. Benjamin Beal Howard owned the whaling ship *John Coggeshall*, and during the 1840s and 1850s he held shares of ownership in over 30 other whaling vessels. From existing records it is unclear whether Captain Howard personally participated in the hunting or simply ran a business from his New Bedford home. His life (1788-1867) spanned the heyday of New England whalers. His ships were only part of a large fleet of Yankee vessels that patrolled the high seas harvesting the giant whales in the post-colonial period.

The world's stocks of sperm whales were quickly over-exploited by my family and their New Bedford contemporaries, but fortunately in the second half of the 19th century the industry began to decline and what was left of the diminishing rebuilt Yankee fleet was lost in the Civil War. Southern privateers captured many ships and word spread that the whaling grounds off the southeastern United States were unsafe to hunt. In 1861, 40 New Bedford whaling vessels, Captain Howard's among them, were loaded with rocks and the "Stone Fleet" sailed south and was sunk in the Charleston harbor to discourage blockade runners.

After the Civil War, small numbers of whale ships continued to sail out of New England and Pacific ports. The discovery in 1895 that mineral oil converted to kerosene could be used in lamps helped to erode the whale oil market. The Yankee sperm whalers eventually died out and the books closed in 1925 when the two remaining ships returned to New Bedford from their last cruise.

Today whale watchers can travel to the cobalt waters of the Gulf Stream and, if they're lucky, view descendants of whales that once were heavily hunted. Over the years, I have encountered thousands of pilot whales off North Carolina. On calm days their spouts can be seen from a mile or more. Whenever we approach a group they usually submerge as we cruise across their path and surface again behind us. Pilot whales are extremely inquisitive and like to investigate everything that goes on around them. Every so often we find a curious individual that comes up behind the boat and rolls its eye out of the water to see what we are about. Whales' eyes are on the sides of their heads, and their lack of frontal vision makes for conspicuous head movements that give away what they are positioning themselves to see. Several times I took our aging golden retriever, Blacky, along on my offshore excursions. The whales and the dog always struck up quite a rapport and it was hard to tell which was the most curious (or confused) about the experience. Short-finned pilot whales are quite vocal and make a popping sound that can be heard distinctly even above the drone of a boat's engine. Underwater the sounds are more like a chorus of bird-like twitters in several different keys. I'm not sure what part of the "song" our dog was hearing, but he felt obligated to answer. His barking, in turn, seemed to stimulate another long volley of vocalizations from the whales.

The whales I see by day are mostly loafing, digesting their food and basking in the warmer waters near the surface. Often they are motionless, expending only enough energy to maintain position or to keep out of the way of our charter boat. The ones on the move are probably making short-range movements to be in position by evening, for these whales hunt mostly at night. Most of my sightings have been along the edge of the outer continental shelf and within a quarter of a mile of the 500-fathom contour. Their association with this water depth probably corresponds with their feeding habits. They feed mostly on squid, and they probably wait until the squid make their nightly vertical migrations toward the surface. An average-sized adult will consume as much as 100 pounds of squid a night.

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***The beaching** of the Wrightsville Beach sperm whale in 1928 was a major public spectacle. Special trains were run to bring onlookers to the beach so they could view the giant whale. The whale's skeleton now hangs in the N.C. Museum of Natural Sciences in Raleigh* *(see p. 18).*

Their nocturnal feeding habits probably explain pilot whales' coloration. Most marine mammals are two-toned, like fish. This counter shading helps them to blend with the dark water when seen from above, and their light ventral surface helps to diffuse their silhouette when viewed from below. Pilot whales, however, are essentially black all over, perhaps because they would receive no benefit from counter shading during their nocturnal foraging.

Running onto a pod of pilot whales, viewers may be surprised at how small these whales are—they are certainly much smaller than the popular conception of whales. Females average only 14 feet in total length and males, 18 feet. Exceptionally large males reach 22 feet. Perhaps they are better thought of as

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**A long-finned** *pilot whale washes up on shore. Follow-the-leader instincts in highly social whales can sometimes strand an entire group. Some of these oceanic animals may be confused and may not understand the nature of shore lines.*

AYCOCK BROWN

**A fin whale lies** *on a beach along the coast in 1961. Many dead and dying whales wash up on shore, but many others that strand themselves are seemingly healthy. Once on the beach, these whales can suffocate of their own weight and their skin can burn. Rescuing large whales is almost an impossibility.*

really big porpoises. The classification of whales and porpoises has nothing to do with length. Whales and porpoises are divided into two major groups depending on whether they filter small marine animals from the water with large, brush-like baleen or hunt their food like a typical predator. Baleen whales range in size from the 102-foot blue whale to the 16-foot pigmy right whale. The predatory toothed whales include various cetaceans that are individually referred to as whales, porpoises and dolphins. While the maximum size is 65 feet for sperm whales, most of the toothed cetaceans are small- to medium-sized porpoises. There are but two species of pilot whales. The short-finned pilot whale is a subtropical species which is present off the North Carolina coast for all of the warmer months. During the winter, the other slightly larger species, the long-finned pilot whale occupies these same waters while its subtropical counterpart migrates southward.

It takes female pilot whales six years to mature and it takes 10 to 13 years for the males. This whale has the longest period of adolescence of any cetacean and almost certainly this relates to the development of strong social units. Pilot whales mate in the fall and have a 13- to 16-month gestation period. Because of the long gestation period there is a two-year period between births. Females are reproductively active for about 25 years and typically produce five to six calves in their lifetime. The young are 6 feet long at birth and grow fast. They only require a brief nursing period because the females have a milk rich in both fat and protein. Most mammals produce milk that is relatively low in fat (2 percent in humans to 17 percent in reindeer) with moderate amounts of sugar (3 to 8 percent). Pilot whales produce milk that's 40 to 50 percent fat and has no sugar.

The flippers or elongated fins of pilot whales are a source of curiosity and some misunderstanding. Their size seems out of proportion to the rest of the whale's body. Examination of the skeleton of a pilot whale, or any whale for that matter, reveals that these fins are formed and supported by a large number of various-sized bones. For years, well-meaning educators have tried to impress the public with the fact that the fins of a whale have a skeletal structure similar to those of a human hand. Actually, the flippers are so highly modified that one could more easily show the similarity between the hands of man and a paw of a Norway rat. What is fascinating about the fins of a whale is not so much their similarity with our hands, but their modifications. Actually a whale's flipper is not just a hand, it is a whole arm. The arm bones are shortened and flattened and the fingers elongated. In typical mammals, man and rats included, each finger has three bones (the thumb has two). Cetaceans have extra ones and the pilot whales have even more than other species. The second and third fingers have 14 and 11 bones respectively. The fingers are enclosed with an enveloping sheath that gives the flipper its flat shape and stiff, but elastic, properties. The shoulder is the only joint that is truly moveable.

What flippers do is another confusing subject. Most people think that flippers are used for swimming, but cetaceans swim with stiff up and down movements of their tails and bodies. The flippers are held at the side and are used for balance and steering. Why the pilot whales have such extraordinarily long flippers is unclear, although they may aid with the underwater maneuvers needed to capture darting squid. Perhaps pilot whales need additional turning ability because of their stiffened necks.

Pilot whales are so named because they have established leaders, usually the dominant male. The normal social unit is a pod consisting of 10 to several hundred individuals. At times off North Carolina, several pods will converge on the same neighborhood and scattered groups of these whales can be seen for miles. Often pilot whales are found in the company of other species of large whales or dolphins. The most common association off North Carolina is with offshore stocks of bottle-nosed dolphins.

One time in early April I came across a huge school of long-finned pilot whales accompanying an even larger group of fin whales. Altogether there were thousands of whales, and scattered among them were schools of dozens of bottle-nosed dolphins. The whales went on for miles and eventually I gave up trying to estimate their numbers. We watched them for several hours, and before the day was over, I was able to locate several minke whales mixed in the group. At the time these were the first minkes ever seen in North Carolina waters.

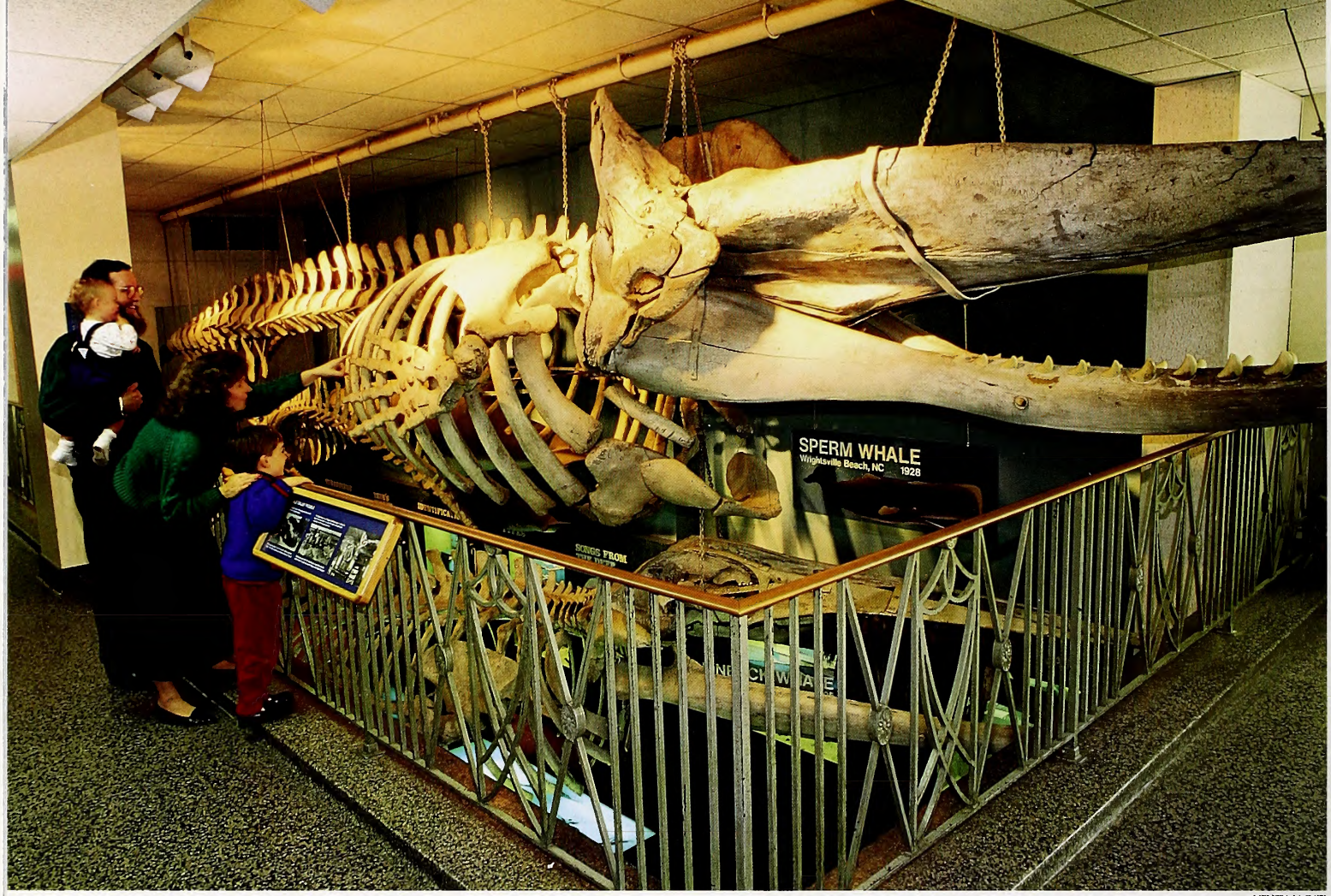
I collect news clippings of mass whale strandings and, by far, pilot whales are the species that most often appear in print. What makes them so vulnerable to these often fatal strandings may well be their follow-the-leader behavior. Whale strandings prompt a good deal of confusion and misunderstanding. Not every whale found on the beach is there because it was stranded. A dead porpoise on the beach is not necessarily a stranding, for example. Dead things float ashore, and so do dying ones, too weak to swim. Only a small percentage of the whales that come ashore are true strandings; most wash up because they are sick or dead. Indeed, so many dead cetaceans have floated onto North Carolina's Outer Banks over the years that the state has the largest documented marine mammal diversity in this hemisphere. Twenty seven species of marine mammals are known from the state.

Strandings are a biological phenomenon and typically involve several seemingly healthy whales. Sometimes the whole school comes ashore. Attempts to turn them back to sea are seldom successful and the animals keep beaching themselves. Why do these animals leave the safety of the sea? First, it should be noted that nearly all mass strandings are of open ocean species; healthy inshore

*"Only a small percentage of the whales that come ashore are true strandings; most wash up because they are sick or dead."*

and coastal species of whales seldom strand. Because of this, biologists believe that the deep ocean species are confused and may not understand the nature of the shoreline—even shallow water is something they may have never before encountered. Second, the species that strand regularly are highly social and travel in moderate-sized schools. Trial-and-error attempts to get stranded groups back out to sea indicate that the whales are following a leader. If the leader goes back to deep water the rest of the school will follow. The problem, of course, is identifying the leader and making sure that animal is rescued first. A whale's bulk and the cycles of the tides make the rescue of most stranded whales impractical.

Many stranded whales slowly suffocate under their own weight. Out of water they are exposed to the sun and their skin can burn so badly that even if the animal is returned to deeper water it may later die of infections. Frustrated helpers can do little more than provide shade and keep the skin from drying out. Typically a school of pilot whales that strand end up high on the beach on the incoming tide. As the tide recedes the pod is left high and dry. Because of their shape, these whales cannot remain in an upright position once the tide goes out, so they roll over on their sides and are helpless until the next high tide. Unlike many whales they can survive for long periods out of water, but the incoming tide covers their blow holes and the pilot whales drown before the water gets high enough for the whales




MELISSA McGAW

***The Wrightsville Beach** sperm whale of 1928 is an attraction today at the N.C. Museum of Natural Sciences. The skeleton of this giant creature was crated and brought to Raleigh where it was arranged and put on display. It was a major undertaking for the day.*

to right themselves.

A well-documented stranding of false killer whales on an island group off the Florida Keys provides much insight into the nature of whale strandings. False killer whales are a deep-water tropical species that I see regularly in the Gulf Stream off North Carolina. In 1976 a group of 30 of these medium-sized whales went aground in Florida. They were able to relaunch themselves on the next high tide, but three days later this same pod became stranded on a bank of coral 160 miles away at Dry Tortugas. One of the whales, a male, lay tilted to one side, bleeding from his right ear. The others formed a tight wedged-shaped group around him. Several people tried to push individual whales into deeper water, but the whales became agitated and they could not be prevented from rejoining the group.

The tidal range in the Tortugas is only about 2 feet so none of the animals were left high and dry and each had the option of returning to deeper water at any time. Many became severely sunburned but all remained with the injured male supporting his head above water. People present report that it was clear that this whale would have toppled over and drowned on the first return tide if it had not been for the support of the group. On the third night the injured male died. The pod of whales slowly dispersed and by the morning of the third day all had returned to deeper water.

During the process people witnessing the event did everything possible to keep the whales wet and to protect them from the sun. One person swimming near the whales found that whenever he breathed through his snorkel one of the whales would break out of the group, swim under him and rise slowly so he was lifted almost out of the water. He was carried to the beach and "rescued." The snorkel was presumably making a noise like a whale's waterlogged blowhole. Strandings are not the result of blind self-destructive urges and the careful recording of facts associated with the event will often explain it.

The real question in strandings is not what causes all of them, but what may have caused a particular one. Illness, parasitic infection, disorientation during storms, confusion caused by gently sloping beaches that are inadequate for reflecting echoes, stray calves, and group leaders panicking in shallow water have all been shown to be factors that contribute to strandings.

The other whale that figured largely in the whaling industry, the sperm whale, is certainly the most famous of the whales found regularly off North Carolina. The females are year-round residents of the deep water zones and are seen commonly near the edges of the outer continental shelf. They live just north of the area where the warm waters of the Gulf Stream take an abrupt turn toward Europe. These whales favor the edges of ocean trenches and areas where strong ocean currents flow in opposite directions. Thus, the offshore area east of Nags Head is ideally suited, and based on early records of my grandfather and other whalers, this has always has been an important whaling ground. It is the place to go if you want to show someone a sperm whale.

This is the great whale of Moby Dick fame, the species that since its first commercial capture in 1712 off the American coast became the mainstay of the whaling industry. This is a whale that can eat up to a ton of squid each day. It specializes in the large deep-water squid but is also an opportunist. Over 49 species of squid are included in its diet, and one whale was found to have 28,000 tiny surface squid in its stomach. They also eat a number of other

types of prey, and these show up often enough to indicate that they are not simply ingested accidentally. The menu includes long-nosed skates, snappers, angler fish, cod, ocean perch, lobsters and other bottom-dwelling species. Their large size allows them to consume large prey. Fourteen-foot sharks have been found in their stomachs. Random sampling of stomachs of whales harvested in the past revealed that they also ate boots, wire, buckets, plastic bags, jellyfish, large deep-sea sponges and quantities of sand.

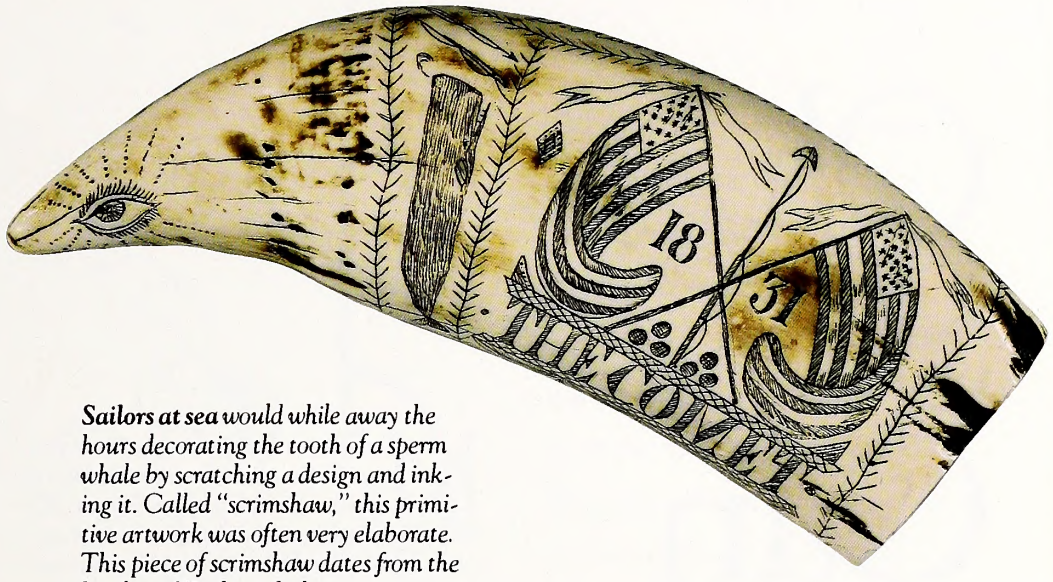
Adult male and female sperm whales have lifestyles so different that you might think they were different species. In the summer males leave tropical waters and head to the subpolar regions. The females and young are seldom found more than 40 degrees from the equator (in our area this is the latitude of New Jersey). In the winter the sexes meet in warmer waters where the largest rival bulls, individuals that are at least 25 years old, battle for control of harems. The nursery pods of mature females and young usually number about 20 to 30, most of which are already pregnant or caring for young. Because gestation lasts for 13 to 16 months, and the care of the young continues for over two years, the entire breeding cycle lasts for up to four years and only a few females are available for breeding in any year. At the time of birth, other females in the harem become helpers. They form a tight protective ring around mothers giving birth and they take turns nudging the newborn calf to the surface so it can breathe. The supportive behavior of sperm whales was well known to whalers and they ruthlessly exploited it. Despite whales' ability to dive and remain submerged for long periods, they would stay at the surface to protect young or injured members of the group. The whalers could pick them off one by one.

Studies of these whales show that they can make round trips to depths of 3,300 feet in less than 15 minutes and stay on the bottom hunting for prey for 45 minutes. The presence of bottom-dwelling sharks in the stomachs of sperm whales captured in an area where the depth was more than 10,000 feet attests to their diving ability. The sperm whale's ability to exploit deep-water areas is important. Most of the other great whales limit their areas of activity to the relatively shallow waters of the continental shelf, or to regions where krill is abundant in surface waters. Over 90 percent of the world's seas, however, are more than 1,000 feet deep. The sperm whale is clearly the master of the world's seas.

The oil stored in the heads of sperm whales and pilot whales is somehow related to their deep-diving behavior. The oily substance is called "spermaceti," so named because early whalers thought it was a store of male sperm cells. The substance is a fluid when the whales are alive, but it becomes solid after the whales die. Deep-diving species have more spermaceti than other whales, strongly suggesting that the substance is related to diving, but exactly how it is used is understandably difficult to prove. It may be related to pressure, somehow allowing the whales to withstand the tremendous pressures of the deep, or it may act as a heat reservoir and help the whales to maintain their body temperatures in the cold deep waters.

The whale stocks of the Hatteras grounds still survive, inhabited all these years by pods of summering potheads and a resident group of female sperm whales. When I see them on my trips offshore, I have to consider that they are likely descendants of the local stocks my ancestors hunted in the mid-1800s. Six generations later, perhaps 10 for the sperm whales, we're becoming reacquainted.

Last summer, among the pilot whales was a group of sperm whales. I asked the captain to hold them off to our starboard. Their wrinkled bumpy backs glistened in the sun. Idling in the water, we watched for a half hour as the large whales eyed us, spouting and replenishing air supplies to their oxygen-hungry tissues. Surrounding both the fleet of sperm whales and our charter boat, the scattered schools of pilot whales remained basking in the summer sun, enjoying the warmth of surface waters. I felt no need to apologize for my ancestors' means of livelihood. It was a different time. I was simply pleased to think that our respective generations could now see eye to eye. ☒



MELISSA McGAW

***Sailors at sea** would while away the hours decorating the tooth of a sperm whale by scratching a design and inking it. Called "scrimshaw," this primitive artwork was often very elaborate. This piece of scrimshaw dates from the heyday of Yankee whalers.*

*David S. Lee is the state ornithologist with the N.C. Museum of Natural Sciences in Raleigh.*

# Oh Say Can You See...

...any red bugs on me?
If you do, pick a few.

written by Deborah Wechsler © 1994

illustrated by Jackie Pittman © 1994

Mention the word "chigger" and you invite the impassioned recitation of a personal horror story. Yet, despite the most intimate acquaintance, most of us know little about these critters. Can you see them? Do they burrow under the skin or do they bite and fall off? (For years, my husband has been insisting that they are really lizard parasites that bite humans by mistake, can't get through our tough hides and die in the attempt.) These tiny, mysterious pests are a big nuisance for anyone who spends time outdoors in North Carolina. It seems worthwhile to learn more about them.

Chiggers, commonly called "red bugs" in the South, are mites, tiny eight-legged arthropods closely related to spiders and ticks. They are red, hairy, and approximately 1 millimeter in diameter—about the thickness of a human hair. Of the thousands of mite species so far identified, only a few cause us problems: house dust mite allergies, scabies, scrub typhus, mange in our pets. One particular family of mites, the Trombiculidae, make up the chiggers; our own local species, *Trombiculi alfreduggi*, has similar itchy cousins around the world.

Only the larval stage causes problems; the adolescent nymph and the adult chigger feed on vegetable matter and tiny insect eggs in the soil. The larvae hatch from eggs laid in soil litter and climb onto leaves to await the passing of any vertebrate host, which they identify by the emission of carbon dioxide gas. Then they climb aboard, attach themselves with their mandibular claws ("jaw claws") and start to feed. The chigger injects its host with a powerful digestive saliva that breaks down skin cells. A hollow tube called a "stylostome" forms, a combination of the saliva and the host's immune response. If uninterrupted, the larva feeds on digested skin cells for three to four days, swelling up to four times its original volume. Then it drops off.

The chigger does not eat blood—it's too small to reach far enough into the skin and must content itself with epidermal cells. And it doesn't burrow under the skin: it's the saliva and the stylostome, which takes seven to 10 days to reabsorb, that cause the itching. Chigger bites start to itch about one to two hours after the larvae starts to feed. Though most chiggers get scratched off within a few hours, the immune response continues.

Chiggers are supposedly visible to the naked eye and are readily visible with a magnifying glass. I've never seen one in the wild, but according to one source, you can determine the presence of chiggers by standing up a black card in their potential habitat. Within a minute, the nearby chiggers should have crawled to the top edge of the card.

I've also never seen a chigger crawling on me; but I realize I have seen tiny reddish orange dots on some bites near my knees, perhaps visible because they has started to swell. (Unfortunately, most bites are not in areas that can be readily examined without either tying yourself in knots or embarrassing someone else.) When you do find a chigger attached, you can pick it up with the tip of a knife or a sterilized needle. Though this won't make the itching go away, it can satisfy the need for revenge on an elusive enemy.

Chiggers are an unhappy surprise to city folks venturing into the outdoors or people from somewhere else who move to North Carolina. "I've got these strange bites," the newcomer will say. "Are they around your waist or your underclothes?" we ask. To an affirmative nod, we say, somewhat smugly, "Red bugs."

Doctors, and the rest of us, diagnose the bites primarily by location—where we've been and where the bites are. Chiggers love tight clothing; it must feel safe and snug there under our socks, swimsuits, underwear, waistbands and bras. Spend some time squatting and they will attack the backs of your knees. In a bad infestation, they aren't so picky and you'll get them all up and down your legs. (The bites of the tiny "seed ticks" that have recently colonized our area look and itch

*My family was camping at Jordan Lake during a heat wave in late June. I was seven months pregnant and sharing a too-small tent with my husband, my three-year-old first-born and approximately 500 chiggers. Each of us had our share—my own bites approximated the coverage of my maternity swimsuit. It was a long, hot, itchy night for all of us, followed by a week of continuing misery. I'm glad to say that we survived the experience willing to camp again—but we did buy a bigger tent.*

—Deborah Wechsler

*One of the librarians at the UNC Health Sciences Library had a personal motivation for helping me in my research. "I was looking for red-cockaded woodpeckers in scrub woodlands of the Sandhills," she told me. "Eight hundred chigger bites, and the doctors just shook their heads over them."*

—Diane McKenzie

*A crew of men were trimming limbs around the power line, and I happened by while they were taking a lunch break. A couple of them were lying down in the leaves, and I asked them where they were from and if they knew about chiggers, since few of us around here would be so brave as to lie down in the leaves like that. They acted unconcerned and didn't react much, but the next day I saw them again and they asked me, "Are you the guy who stopped by yesterday? We know all about chiggers now!"*

—Jerry Markatos

*I moved here from the West Virginia Appalachians and I started encountering chiggers when I went bird-watching around the Eno River. I got eaten alive. I missed one whole day of work looking for doctors who knew what to do about them.*

—Franz Thomas

much like chiggers; aside from minor variations in choice of bite site, the only difference is that you can more easily see the ticks.)

Most of us have learned from sad experience where chiggers lurk. They like tall grass, cutover brushy areas, disturbed land. Blackberry thickets are a favorite. Gravel beds and well-kept lawns on land only a few years cleared can be unexpectedly awful. Chiggers overwinter as adults and follow an annual cycle, with larval populations building in the spring. Here in North Carolina, you are most likely to get bitten during June and July. My own unproven theory is that there are two kinds of chiggers. One is the tall grass, brushland, blackberry chigger. The other, far more vicious, is the pineywoods chigger, found lurking in places like Jordan Lake's campground and around the swing set and sandbox in my backyard. I'd rather wade through tall grass or pick blackberries all day than sit down on pine needles.

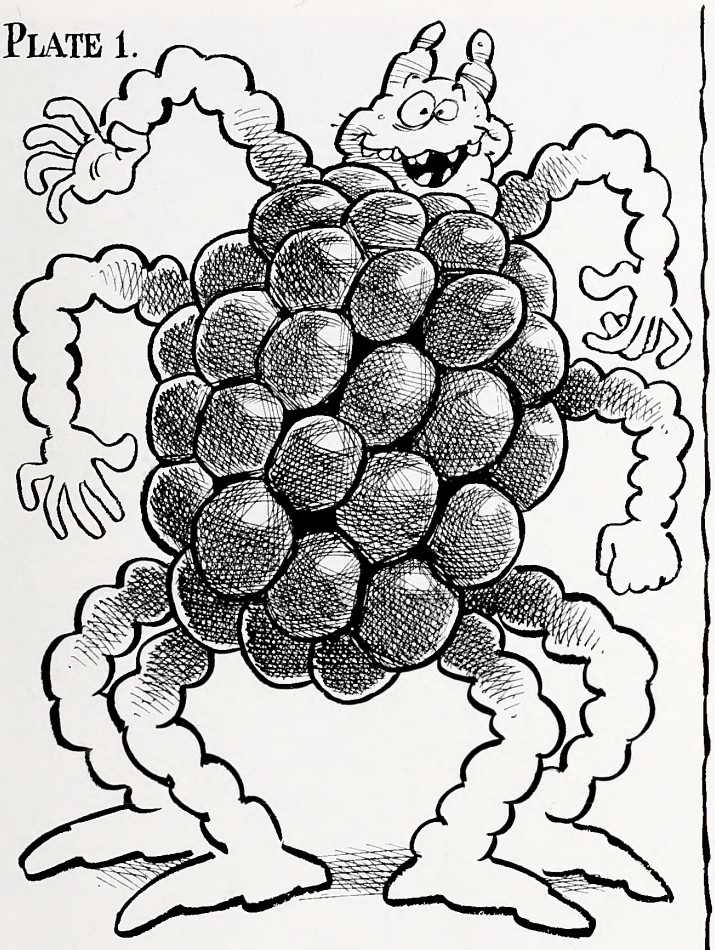
Short of staying indoors, what can you do to avoid chiggers? If you can stand being cooked alive, tightly woven protective clothing will work. Wear long pants with the cuffs tucked into boots and long sleeves buttoned at the wrists—and take them off and wash them as soon as you come in, or the chiggers will eventually work their way in. (The bird watcher quoted above discovered that wearing dance tights under his clothes was the best. "They look at you funny when you ask for ladies' Danskins, and you sweat like crazy, but after a while you kind of get into it.")

Old-timers used to put kerosene on their cuffs when they went blackberrying. Sulfur was used as a repellent, either dusted on, applied with Vaseline as a barrier strip, or soaked into clothing. Vaseline alone was also recommended as a deterrent barrier (and won't irritate the skin like kerosene or sulfur might). Today, DEET-type repellents are most commonly recommended. Applied around the ankles or wrists, Deet will kill chiggers (not just repelling them). Pyrethrin insecticides can also be used.

If you don't want to slather yourself with pesticides, you can shower with soap promptly after straying into chigger country—within an hour of exposure. Surprisingly effective control can also be obtained by just hosing off your legs or rubbing them vigorously with your hands every hour or so while you are outdoors. You may also want to take a lesson from wildlife biologists—who have to spend their time in woods whether the chiggers are out or not. They often tuck their pants legs into their boots and seal the seams with duct tape.

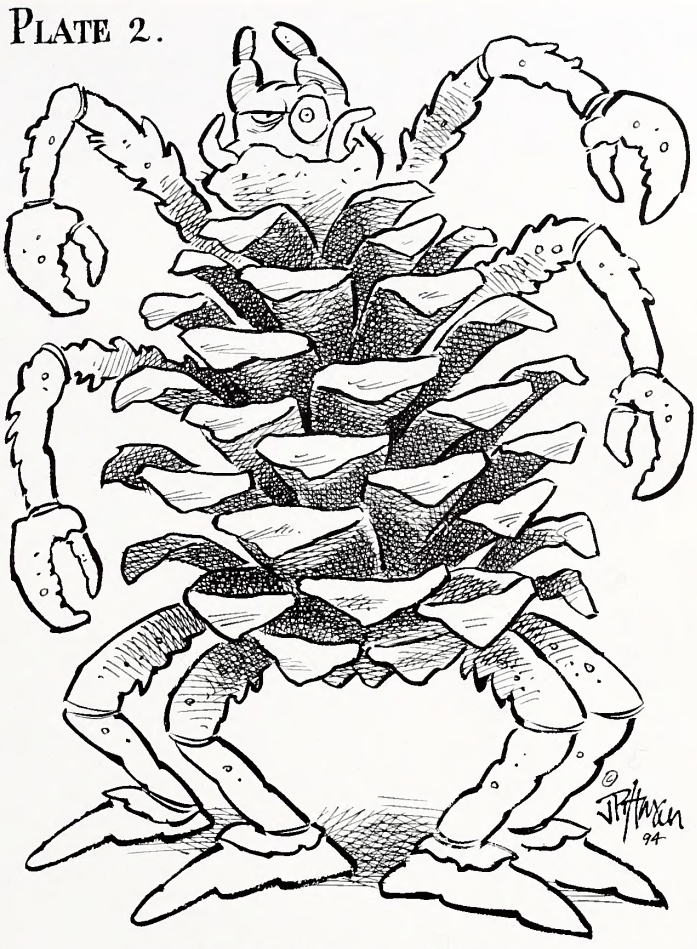
Though you can't do anything to reduce chigger populations in the wilderness, in your own yard you can reduce populations by keeping brushy areas at the edge of the lawn cut back and mowing regularly. Spraying

PLATE 1.



**BLACKBERRY CHIGGER**
*(berrymitus bitus)*

PLATE 2.



**PINEYWOODS CHIGGER**
*(inyabritches quickus)*

insecticides is unreasonable overkill and not particularly effective, because chiggers will quickly reenter from neighboring brushland.

What can you do once you've got these horribly itchy bites? The folk remedy of applying clear nail polish to the bites is based on the erroneous assumption that chiggers burrow under your skin and stay, where they can be smothered by the polish. It doesn't work. This summer, for the sake of science, I got up in the middle of the night and tested several remedies on my multitude of bites. (I do my best thinking and itching at 2 in the morning.) I tried a commercial nail-polish preparation (Chigger-Rid), topical Benadryl, cortisone cream, and a homeopathic herbal cream called Sting-Stop. I can report that the Chigger-Rid made the bites itch worse, the Benadryl and Sting-Stop provided some relief, and the cortisone cream worked best. According to my children's pediatrician, these recently available over-the-counter cortisone creams are quite safe, even for children, though you wouldn't want to apply them to a large area of the body. Baking soda or oatmeal baths and calamine lotion can also give some relief. In a really bad case, it may be necessary to take oral antihistamines or steroids. Especially in children, bites that are scratched open may develop secondary infections.

Some people's immune systems seem very sensitive to the bites while other folks are virtually unaffected. And people who are around chiggers on a regular basis can develop a tolerance to continued bites. The level of immunity decreases over the winter. The first chigger bites of spring again provoke a reaction, but act as a immunity booster dose, so that later bites are less troublesome.

More than most of the pests that plague us, chiggers can make you feel like you're living in a malicious universe. Not only can you not see them coming, but the effects only show up several hours later. It's hard to appreciate that, like the rest of us, they're just trying to make a living. (Feeding on a vertebrate host is, in the words of the entomologists, "obligatory.")

The real damage is if we let chiggers prevent us from enjoying the outdoors. Staying indoors seems a sorry solution. Far better to think ahead and prevent your bites, treat them when you get them, or scratch, swear, revel in misery, and collect chigger horror stories. ☒

# Boy Scouts Go WILD

It's a great matchup when Project WILD goes to camporee with the Boy Scouts of America.

written by Mike Campbell
photographed by Ken Taylor

To a casual observer, it looked like a mass of confusion. Children—thousands of them!—were running, jumping and screaming in what seemed like a chaotic human beehive. Yet on closer inspection, the kids were actually mimicking various species of wildlife, doing almost everything you would expect an animal to do to survive. Concentrated in two five-acre fields, the children were eating, hiding, avoiding predators. Pandemonium, for sure. But to the kids who were there, it was a day of learning and fun.

On that October day, 6,350 Boy Scouts, Cub Scouts, Weebloes Scouts and their leaders from the 12 counties that comprise North Carolina's Occoneechee Boy Scout Council participated in the "All Things Are Connected" Camporee. The camporee, sponsored by the Occoneechee Council, the N. C. Wildlife Resources Commission and the N. C. Wildlife Federation, offered Scouts of all ages an opportunity to learn through activities how forests, soil, water and wildlife are interrelated. The event used activities from Project WILD, the environmental-education program of the Wildlife Commission's Division of Conservation Education. The camporee theme, "All Things Are Connected," is the overall theme of the division and also is the title of a video recently produced by the division. This message is based on a speech attributed to Chief Seattle, a Native American, and the values Native Americans place on wildlife and the environment.

The camporee was a new experience for the Scouts of the Occoneechee Council. "A typical camporee consists of traditional Scout skills such as pioneering, knot tying, fire building and first aid," said Tim Harper, program director for the Occoneechee Council. "We wanted to offer Scouts and their leaders a day of fun while learning about their environment, and also give them something they could carry back home. We examined the Project WILD materials and found exactly what we were looking for."

An undertaking of this magnitude required a great deal of preparation, continued Harper. "The camporee was nine months in the planning. We had to ensure that all the needs of the campers and their families were met. Food and water sites, first-aid and toilet facilities, and communication centers had to be installed." It was difficult enough to host an event equaling the population of a small town, but then instructions had to be given on what to teach the Scouts on the day of the camporee.

To make sure it all came off without a hitch, the Conservation Education Division sponsored a series of Project WILD workshops to present volunteer leaders with information they would need to conduct activities and help the Scouts. "We decided that the best and most efficient way to teach the large number of Scouts that we anticipated was to ask our adult leaders to commit one Saturday in order to receive the training," said Harper. "Giving up Saturdays is nothing new to the volunteer leaders. These men and women donate a great deal of their time for Scouting. It is always encouraging to see their commitment and dedication."

Led by the division's education specialists, the workshops were nearly as exciting as the camporee itself, as 130 leaders learned about Project WILD and participated in the activities that would be used during the camporee. Separate versions of each activity were provided to make them age-appropriate for both Cub and Boy Scouts. One activity, "Quick-Frozen Critters," required participants to become either rabbits or foxes and to simulate a predator/prey relationship by playing a very active version of freeze tag. As the leaders soon found out, winning this activity meant survival, while losing meant starvation or, worse, being devoured by a fellow competitor playing the role of a predator. This led to a highly competitive battle among the adult leaders that would easily compare to any playground full of restless youngsters. As the temperature at one of the workshops hovered near the 100-degree mark, these "critters" took their roles as seriously as the creatures they were imitating. "It was amazing that these leaders had so much energy and enthusiasm in that heat," noted Katrina McDougald, one of the specialists who taught the workshops. "These folks really focused on the activities. They learned about basic ecological concepts, and they had a great time doing it."

Judging from the sore muscles and a few skinned knees, it did look as if the leaders were indeed fighting for their lives. In the end however, both "foxes" and "rabbits" gathered together to discuss how the activity symbolizes a natural relationship. " 'Quick-Frozen Critters' is a great example of the effectiveness of Project WILD," said Betty Moody, a volunteer who headed the Cub Scout program and activities for the camporee. "Most people do not understand the constant struggle that animals endure in order to survive. We, as humans, can't comprehend the constant fight for survival. In the hour that it took to complete this activity, these leaders were reminded of that, and by actually experiencing it, they probably will not forget it."

The enthusiasm shown by the participants during the training sessions is common during Project WILD workshops, but the Cub and Boy Scout leaders represented a group that is not normally targeted for training. "The 'All Things Are Connected' Camporee was a good opportunity for us to explore a new audience," said Sid Baynes, chief of the

***A Project WILD activity** called "Hooks and Ladders" helps Scouts understand the hazards encountered by spawning striped bass (left). The jump rope simulates a dam and other parts of the activity represent predation and fish ladders. Below, a Scout plays "Oh Deer!" in which players compete for the principal components of habitat.*

***Traditional camporees** hone skills such as knot tying and first aid, but at the "All Things Are Connected" Camporee, Project WILD activities helped Scouts understand the importance of habitat to wildlife. In "How Many Bears Can Live in this Forest," Scouts learned how bear populations are influenced by limited food, shelter and space.*

Division of Conservation Education. "Our primary audience is schoolteachers, but this camporee gave us a chance to work with informal educators who do a great deal of teaching outside the traditional classroom." Indeed, Scout leaders are involved in educating young people to a greater extent than most people realize. Baynes also served as camporee chief for the event.

To advance in the programs, Scouts must meet requirements for achievements, ranks and merit badges in various subject areas. These requirements cover a wide variety of topics that are not unlike a standard curriculum in a school system. Over 100 merit badges cover such subjects as business, crafts, sports and future careers. Many of the merit badges are in the field of natural resources—forestry, fish and wildlife management, environmental science, soil and water conservation, as well as units in bird, reptile, and insect studies—and require Scouts to complete activities to increase their knowledge in that field.

"This venture was not designed to be a one-day event," said McDougald. "The training that these leaders received not only benefited the Scouts on the day of the camporee, it also gave the leaders program materials and activities to use at future unit meetings and events. The information they received will last a lifetime." In addition to the Project WILD materials, workshop participants received a manual that correlates Scout advancement requirements to Project WILD activities.

Celeste Wescott, youth activities specialist with the Wildlife Resources Commission, added, "We wanted to create a very practical and applicable correlation that guides Scouts and their leaders as they use the award-winning, national program, Project WILD. The correlation lists Cub and Scout requirements that can be met by participating in Project WILD activities."

Armed with the information needed to lead the Scouts through a day of instruction, the Scout leaders met at Camp Reeves, a 2,400-acre tract owned by the Occoneechee Council and nestled in the Sandhills near Carthage. The day began not with the glitter and spectacle one may associate with an Olympic opening ceremony, but with a frenzy more associated with a bluefish blitz. Suddenly, thousands of Scouts, dressed in their familiar blue and green uniforms, appeared from hundreds of wooded campsites to convene at their assigned "classrooms." With an enrollment the size of a small university, scheduling the "classes" was no easy task. A very elaborate rotation was designed to ensure that everyone received the four activities that were designed for them. Project WILD activities selected for the camporee tested many of the same abilities needed in a traditional camporee. Athletic ability, endurance, intuition and knowledge were needed just as those traits are needed to compete in normal camporee activities. However at this camporee, Scouts used those traits while role-playing various species of wildlife.

In one activity, "Oh Deer," Scouts became whitetail deer in search of three essential components of habitat—food, water and space. They found out quickly that deer populations have the potential to explode to astronomical numbers until one of these habitat components is used up, becomes a limiting factor, and deer begin to die. As the number of deer, or Scouts in this case, increased, their food, water and space was nearly depleted. This eventually led to a dramatic population decline as there was not enough of a component to sustain a healthy herd. Leaders explained to the participants that, before they disappeared cougars and other large predators helped keep deer herds in check. Properly managed hunting has a similar effect on deer populations. As with actual deer management, hunters were introduced into the activity. The Scouts then searched for food, water and shelter while being occasionally pursued by hunters. As is usually the case, some of the deer were not as fortunate as others.

In another activity, Scouts became members of a very simple food chain. "Deadly Links" had participants mimicking grasshoppers, mice and hawks in an active game of survival. Grasshoppers were instructed to forage for food, represented by tokens, while being preyed upon by mice. If the mouse was able to "consume" the grasshopper, it would collect all the tokens the grasshopper had gathered. While this was taking place, hawks circled the field in search of mice. If the hawks were successful hunters and pounced on a mouse, the mouse would hand over the tokens they had collected from the grasshoppers. At the end of the activity, Scouts discussed the concept of food chains. They learned that each link in a food chain is vital, and that all the animals involved are dependent on each other for survival.

At this point, it seemed that the winners and losers were obvious, but to the Scouts' surprise, this was not the case. Some of the tokens were marked to represent food tainted with the pesticide DDT, and the result was that many of participants who thought they had survived were told that because of excessive amounts of the toxin in their system, they had also died. "While most of these kids understand food chains, they learned that toxins can be passed on from one animal to the next," said McDougald. "In this activity, the hawks were not targeted by the pesticide, but were indirectly affected by its use.

" 'Deadly Links' illustrates the fact that our irresponsible actions as humans can be harmful to wildlife. We want these Scouts to understand that they need to make responsible decisions regarding the environment."

As the day came to a close and the Scouts and their leaders retreated to their campsites for the evening meal and campfire, some of the volunteer coordinators reflected on the success of the camporee. "It's nice to see a program, such as Scouting, teach our young people positive values," said Don Schmidt who coordinated the Boy Scout program and activities. "For instance, this camporee helped our Scouts learn about natural resources by actually experiencing the problems that face wildlife and our environment. With its hands-on approach, this program is better than any other that I have seen. The lessons learned here will have a lasting impact."

Young people soon enough become the adults of tomorrow, making the important decisions regarding our natural resources. That's why organizations such as the Boy Scouts of America, the Wildlife Commission and the Wildlife Federation are working to ensure that children are well-educated about the environment. With help from Project WILD, the 1993 "All Things Are Connected" Camporee showed that conservation education can also be fun.

***Volunteer Scout leaders** attended Project WILD workshops to prepare them for their staff roles in the "All Things Are Connected" Camporee. Here they spend a Saturday learning how to play "Hooks and Ladders." The activities were taught by education specialists from the Wildlife Commission's Division of Conservation Education.*

North Carolina WILD

Project WILD workshops are available free of charge to classroom teachers, environmental educators, park and nature center personnel, and youth group leaders. Workshops last from six to ten hours, and public school teachers may receive 1.0 CEU credit for a ten hour workshop. Participants receive Project WILD activity guides as well as other educational material. For more information, contact:

North Carolina WILD
N.C. Wildlife Resources Commission
Division of Conservation Education
512 N. Salisbury Street
Raleigh, N.C. 27604-1188
(919) 733-7123

MELISSA McGAW

*Fish Radio-Tagged in Lake Norman*

# Research Shows How Striped Bass Are Able to Beat the Heat

*Written and Edited by Vic Venters*

A recently completed study on Lake Norman is shedding new light on how striped bass survive hot water conditions during the summer. The 30,000-acre reservoir supports a popular striped bass fishery, but biologists have long been concerned that poor habitat conditions in late summer were limiting striper populations. As stripers age and grow larger, they need cool, oxygenated water—80 F or less and oxygen levels of two parts per million—to thrive.

Because of late-summer water temperatures, Lake Norman usually doesn't appear to offer suitable habitat for striped bass. Biologists monitoring Lake Norman had observed few die-offs of large stripers, so they thought that the fish were finding a thermal refuge—an underwater spring, for example—where temperatures were cool enough for fish to survive.

During the summers of 1992 and 1993, biologists with Duke Power Company and the N.C. Wildlife Resources Commission implanted radio transmitters with temperature sensors into striped bass 20 inches or longer. Using tracking devices, biologists could follow the fish and find out where they were holing up in late summer.

What the study revealed was something of a surprise. From late July to mid-August, water temperatures rose so high in Norman that there were no significant thermal refuges in the lake. Technically, the lake offered no suitable habitat for stripers weighing more than 4 or 5 pounds. Fortunately, however, researchers found that the older stripers were able to adapt to the hot water by retreating to the deepest water that still had sufficient oxygen, usually in main creek and river channels and off deep points.

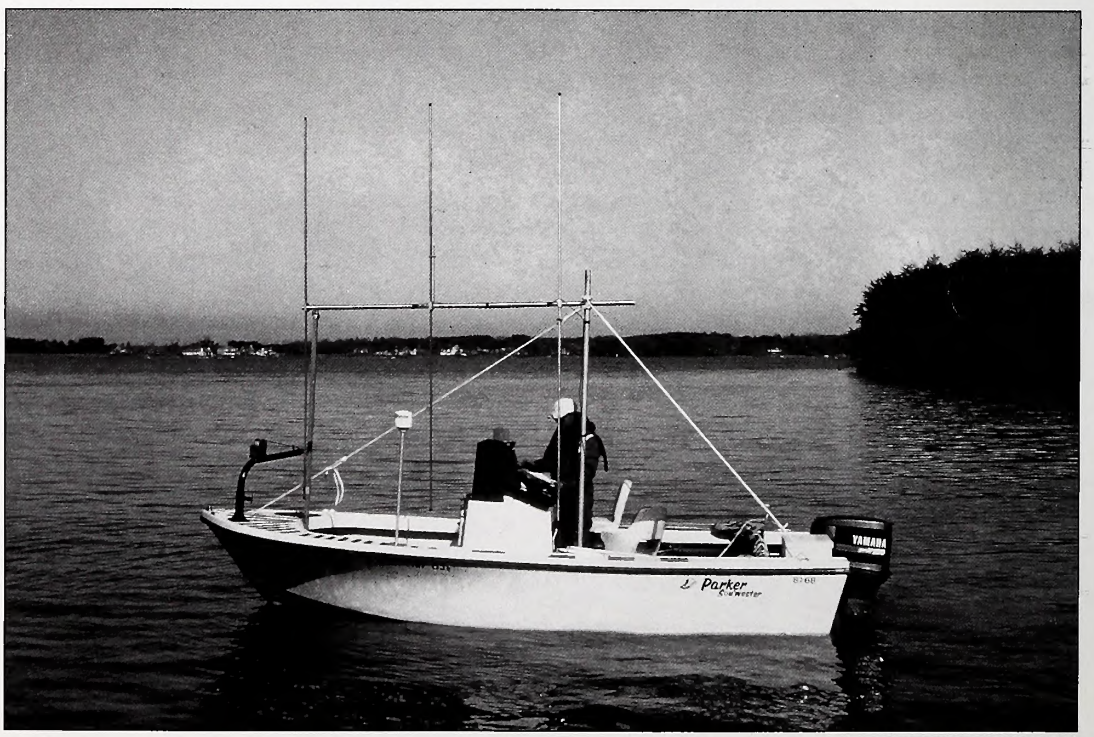
"For large stripers, Lake Norman's summer habitat is poor," explained Scott Van Horn, the Wildlife Commission's Piedmont Fisheries supervisor. "There really were no magic places for stripers to find refuge in. But the fish are able to tough it out for a period of weeks. They tend to move around quite a bit in search of the coolest possible water.

"During this time, the larger stripers are stressed and lose a lot of weight," Van Horn elaborated. "What happens is that the stripers seek refuge in the coolest water, while the forage fish they feed on are generally in warmer waters above them. The stripers are unwilling to leave their location to feed on them. Once the water cools down after mid-August, the stripers go back on the feed and quickly regain their weight."

The findings have some management implications for Lake Norman, mostly good ones for anglers. "In the past, we have been stocking Norman with stripers at rates of about three fish per acre," Van Horn said. "We had concerns about exceeding that number because we suspected that if we stocked fish in greater numbers, there might not be enough thermal refuges to support the fish. However, since the fish aren't dependent on a thermal refuge, we can up the stocking rates. Although the summer habitat is poor, the lake should be able to support more fish since they are spread out over a wide area."

The Wildlife Commission has since raised stocking rates to five stripers per acre. "These rates should make for even better fishing down the road," Van Horn said. "However, the tough summer habitat conditions will probably keep Norman from ever being a good trophy lake, at least for really big fish."

The study's findings may also affect the way anglers fish for stripers in the summer. "While larger stripers can survive the hot weather, their survival in late summer is very poor if the fish are caught and released," Van Horn said. "During this time period, once an angler catches a limit of stripers to keep, they should stop fishing because most of the large fish—20 inches or over—that would be released will probably die." Van Horn added that striper mortality is much lower in cooler months, and that released stripers have a good chance of survival then.




N.C. WILDLIFE RESOURCES COMMISSION

***Using radio-tracking** equipment, biologists were able to track and study the movements of tagged striped bass in Lake Norman over the past two summers. The research is yielding new information on how striped bass are able to survive warm waters during hot summer weather.*

*Students Stress Conservation Themes*

# North Carolina Regional Science Fair Award Winners Announced

You don't have to look much farther than North Carolina schools to see that students are already devoting time to help solve some of the serious problems facing the environment today. Some of the projects at this year's eight regional science fairs dealt with topics such as acid rain, water pollution, waste management and wildlife behavior.

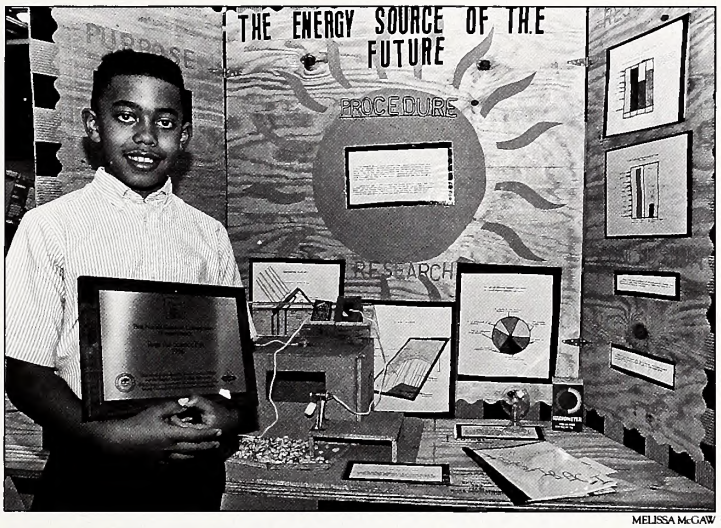
To encourage the projects, the N.C. Wildlife Resources Commission's Division of Conservation Education and the N.C. Wildlife Federation sponsor Natural Resources Conservation Science Fair Projects.

The regional science fair awards are presented to the students whose science projects recognize the importance of natural resources conservation through interesting and innovative activities. Each year the projects are judged at the eight regional science fairs. Award winners are selected by Wildlife Commission and Wildlife Federation personnel.

The science fairs are exhibitions of scientific projects prepared and presented by students under the guidance of their teachers and with the help of other persons interested in the science topics being explored. The fairs are sponsored and coordinated by the N.C. Association of Science Teachers (NCSTA) and the N.C. Math and Science Alliance.

In every region, Junior and Senior awards consisting of a cash prize and a plaque are presented to winners. If a region has an Elementary level competition, a cash prize and plaque is presented to the Elementary award winner.

However, if the region does not have a Elementary level competition, then the Merit award may go to either a Junior or Senior runner-up. Prizes are as follows: Senior Division (grades 9 to 12) $50 and plaque; Junior Division (grades 6 to 8) $50 and plaque; Elementary Division (grades 3 to 5) $50 and plaque; Merit Awards (grades 3 to 12) plaque. The following students won regional science fair awards for 1993-94:




MELISSA McGAW

***Jonathan Silver** won Region 3's Elementary Science Fair Award.*

**Region 1 Senior Division:** David Crank of Manteo High School for "How do different colors of light affect the anole's rate of color change?"

**Region 1 Junior Division:** Matthew Price of First Flight Middle School for "Saving Hatteras lighthouse."

**Region 1 Merit Award:** Coral Dickens of Cape Hatteras School for "Tires as artificial reefs."

**Region 2 Senior Division:** April Caldwell of Goldsboro High School for "A contamination assessment of three major eastern North Carolina rivers."

**Region 2 Junior Division:** David Ingram of Myrtle Grove Christian for "Water source effects on plant growth."

**Region 2 Merit Award:** Jandi Willis of Gramercy Christian for "Is stormwater runoff polluted in Atlantic Beach?"

**Region 3 Senior Division:** Sarah Bruck of Cary High School of "Can remineralization save the tropical rainforests?"

**Region 3 Junior Division:** Thomas Mangalan of Hawley Middle School for "A comparative study of how acid rain affects cell structure of freshwater hydrophyles."

**Region 3 Elementary Award:** Jonathan Silver of Hawkins Elementary for "Energy source of the future."

**Region 4 Senior Division:** Colin Freccia of Fayetteville Elementary for "Effects of oil on photosynthesis in aquatic plants."

**Region 4 Junior Division:** Crystal Underwood of Stedman Elementary for "Using absorbent oil booms in steam cleaning—Do they work?"

**Region 4 Elementary Award:** David Percival of Southeastern Academy for "Acid rain—using limestone to protect pine trees."

**Region 5 Junior Division (tie):** Lisa Birnbaum of Phillips Middle School for "Does recycled paper decompose as quickly as standard paper?"

**Region 5 Junior Division (tie):** David Cook of Allen Jay Middle School for "Deep River—safe river."

**Region 5 Elementary Award:** Mark Chambers of Draper Elementary for "Recycling and robotics."

**Region 6 Senior Division:** Jennifer Thornton of East Mecklenberg High School for "Control of *Dreissena Polymorpha*."

**Region 6 Junior Division:** Kimberly Reynolds of Charlotte Christian School for "Landfills: Pollution or solution?"

**Region 6 Elementary Award:** Robert D. Meisenheimer of Rock Springs Elementary for "Degradable?: I don't think so."

**Region 7 Senior Division:** Josh Connolly of West Iredell High School for "A two-year comparative study of the effect of non-point source pollution (animal waste) on streams and ponds."

**Region 7 Junior Division:** Andy Allen of William Lenoir Middle School for "Environmental impact of household chemicals."

**Region 7 Elementary Award:** Clay Savely of Riverview Elementary School for "Simulated oil spill to determine the effect of petroleum on aquatic life."

**Region 8 Junior Division (tie):** David Jones of Dunbar School for "Dropping the acid."

**Region 8 Junior Division (tie):** Sara Queen of Waynesville Middle School for "Richland Creek water quality study."

**Region 8 Merit Award:** Marc Burrell of Fairview School for "Are landfills safe?"

For more information on the Natural Resources Conservation Science Fair Awards, contact the N.C. Wildlife Resources Commission, Division of Conservation Education, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

## Correction

The Partners in Flight land managers meeting in Little Switzerland will be held May 12-13, not May 17-18 as reported in the February issue of *Wildlife in North Carolina*.

*41 Pounder Caught in Fontana Lake*

## New State Record Muskellunge Landed

A 41-pound muskie was landed from Fontana Lake on February 16 to set a new state record. Angler Chancy C. (Bill) Jones Jr. of Clyde caught the fish on a red- and pearl-colored Hopkins spoon while fishing for walleye.

Landing the muskie wasn't easy for Jones, who had no wire leader and a reel spooled with only 12-pound test line. "We had been jigging spoons for walleye in water about 125 feet deep," said Jones. We hadn't done much there, so we moved in to shallower water."

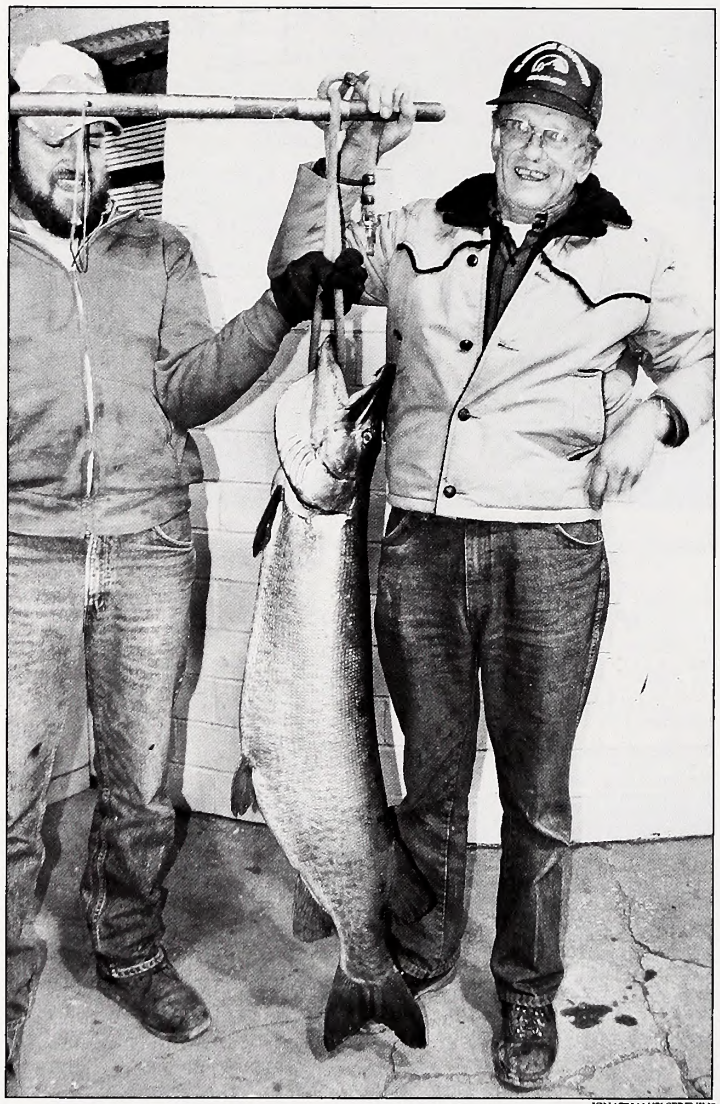
"With my fish finder, I located a school of walleye in about 25 feet of water," Jones explained, "and we caught one. All of a sudden, the walleye disappeared. A little bit later I had a strike and the line took off for deeper water."

"I knew I had something big, so I told my son to follow it using our electric motor," he said. "It just kept stripping line, but I didn't know what it was. You can hook just about anything when you drop a hook into Fontana."

After battling the fish for 1½ hours, Jones finally steered it into shallow water between the boat and the shoreline. "We still didn't know what it was because I could only see about two feet of the fish's back," Jones said. "I told my son to boat him with our little net."

As soon as the net touched the fish's head, it dove, exposing for the first time its size. "It tore me up when I saw 3½ feet of fish come out of the water," Jones said. "The net only went up to the muskie's gills, so I dropped my rod and pushed both hands in the net to grab its gill plates. I got a few cuts on my hand but we hauled it in."

Jones had a small dog in the boat. "Usually when we boat a fish the dog jumps right on it," he said. "This time it stayed in the back of the boat."



JONATHAN W. SERENIUS

***Angler Bill Jones** of Clyde (right) hoists the new state-record muskie that he caught from Fontana Lake in February. Jones battled the 41-pound fish for about an hour and a half. Also pictured is his son, Tim, who was in the boat.*

The muskie, a female according to Wildlife Commission biologists, was 50 inches long and had a girth of 26 inches. It broke the old state record, a 38-pounder caught by Dale Hogue in 1989. Hogue's fish had come from the Little Tennessee River above Fontana Lake, about 3 miles from the location of Jones' record setter. Hogue had also been fishing for walleye when he caught his record fish.

The new state record was the first muskie for Jones, who describes himself as an avid walleye angler. "I've had them on before, but they usually cut your line immediately." This fish, however, had the hooks embedded just past the teeth, but the lure and monofilament was out of reach of the teeth. Jones has sent the trophy to a taxidermist for mounting.

## Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event.

**May 21**

A Neuse River Day celebration will be held at Union Point on the waterfront in New Bern to benefit the Neuse River Keeper Program. Educational exhibits, lectures, a boat parade and a sailing regatta will highlight the event. For more information, contact The Neuse River Foundation, P.O. Box 5451, New Bern, N.C. 28560, or call (919) 637-7972.

**May 28**

The 5th annual Great Smoky Mountain Trout Festival will be held at Waynesville. Local trout anglers, aquaculture businesses and conservation groups will present demonstrations, crafts and educational exhibits on trout and trout fishing. Proceeds benefit local cold-water resource conservation. For more information, contact the Haywood County Chamber of Commerce at (704) 456-3021.

**Through June 12**

"Excellence in Nature Art," a juried art show on exhibition at SciWorks in Forsyth County, is being sponsored by the N.C. Nature Art Association and SciWorks. For more information, contact Kerry Mowery, SciWorks, 400 W. Hanes Mill Road, Winston-Salem, N.C. 27105, or call (910) 767-6730.

**June 26-July 1**

The Twelth Annual Fur, Fish 'N' Game Rendezvous camp for boys and girls will be held at Millstone 4-H Camp near Ellerbe. Pre-registration is required. For more information, contact Leon Harkins at (919) 515-5575.

*What Role Do Chemicals Play?*

## Quail Decline Article Draws Response

Dear Sirs:

I enjoy your magazine and am a lifetime subscriber. However, I feel compelled to comment on an article in your last issue, "Are Pesticides Harming Quail?" (February 1994). To the best of my knowledge, there are no inaccuracies in the article, but there are some points that should be made so that readers who are not involved in agriculture will have a more accurate view of pesticide use.

I am concerned that devotion of 80 percent of the first two pages of spraying a soybean field will lead readers to believe they are regularly sprayed with insecticides. In actuality, soybean fields are infrequently sprayed, and over the last five years, I would guess that only 5 percent of the acres in the state were sprayed. Also, granular insecticides are probably rarely used.

Cotton is treated annually for foliar insects, with an average number of two to four applications, depending on the area of the state. An agricultural consultant friend of mine found a quail nest in a cotton field this past year, and monitored it out of interest through three applications of an insecticide. To the best of his knowledge, there was a 100-percent hatch and all quail survived.

I am glad you mentioned that pesticides can be used to improve habitat. Vegetation management with the use of pesticides can be either to the improvement or detriment of habitat.

I believe that when the quail study is completed, pesticide use on farms will not be implicated as a direct cause of declining populations, but rather their use in vegetation management will be found to decrease cover and food (weeds, seeds and, to a lesser degree, insects).

As a not-too-serious hunter and angler, but avid wildlife observer, I appreciate your efforts to increase wildlife in our state. I work for an agricultural chemicals manufacturer, and therefore am somewhat sensitive to someone loosely associating pesticides with declining wildlife populations without evidence. Several of my sportsmen friends believe that pesticides are the overwhelming cause of the decline of several species, including quail. While pesticide use cannot be completely exonerated, I believe the perception is much worse than reality, and the suggestive title of the quail article serves to mislead readers and enforce their beliefs.

Thanks for your time and kudos for a magazine that has remained a favorite to me for all my reading years.

—*Steve Lowder*
*Goldsboro*

*Editor's Response: The impacts that pesticides may have on wildlife populations are a concern to many North Carolinians, as Mr. Lowder indicates. This is why the N.C. Wildlife Resources Commission supports scientific research to determine if impacts occur. Through such research, farmers and wildlife managers will learn how to make farming and wildlife more compatible on modern farms.*

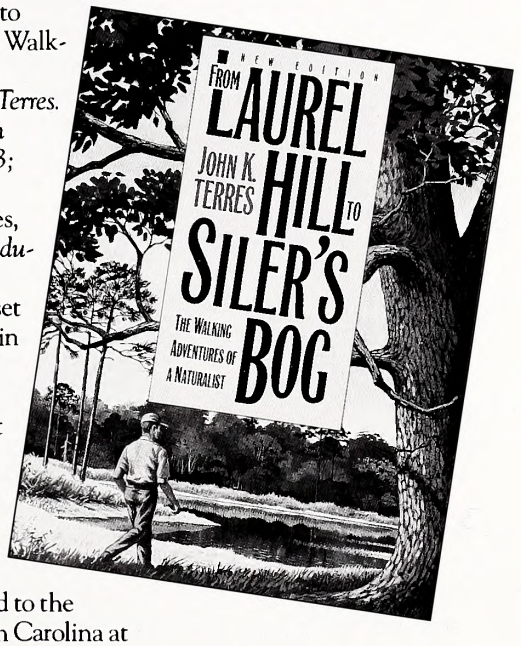
BOAT SMART · BOAT SAFE · BOAT SOBER

**Booze & Boats Don't Mix**

National Safe Boating Council

*Book Review*

## Reprinted: *From Laurel Hill to Siler's Bog*




*From Laurel Hill to Siler's Bog: The Walking Adventures of a Naturalist, by John Terres. (University of North Carolina Press, 1993; paperback $16.95).*

When John Terres, former editor of *Audubon* magazine and noted author, first set foot in Chapel Hill in 1961, he discovered a small Piedmont wildlife paradise just outside the town. Mason Farm was a mosaic of fields, woods, creeks and swamps that the owners had donated to the University of North Carolina at Chapel Hill long before. Wild and undeveloped, it was hard for a naturalist to resist its lure, and soon Terres was taking his measure of the place.

Over the next nine years, Terres roamed the farm, meticulously noting the habits of the secret brotherhood of quail, barred owls, raccoons, hawks, wild turkeys and others of the farm's wild inhabitants. His book, *From Laurel Hill to Siler's Bog*, was published in 1969 to acclaim, and it has been recently reprinted in paperback by the University of North Carolina Press.

Readers will delight in Terres' sensitive descriptions of the animals he studies and their behavior. He watches as a gray fox steals close to a covey of quail and snatches one out of the air. He reads the tale of an encounter between copperhead and raccoon written in the dust of a trail. He grows fond of a legendary black gobbler that had escaped even the wiliest hunters in the area.

*From Laurel Hill to Siler's Bog* teaches eloquently about the life of a naturalist, about the thousands of hours that go into noting and attempting to understand the behavior of even a single species. Though sensitive to the animals' lives, Terres does not shy from the hard-edged reality of life in the wild. Describing a peaceful scene of raccoons sitting in the open after a snow storm, he writes: "Yet they were wild and free, and this must be freedom's way for them—taking the small comfort between terror and pain before the last sweet darkness and silence without end."

The book also provides a window into a Piedmont that has nearly vanished over the last 30 years. A region of small towns and farms and wildlife has been transformed by subdivisions, highways and large reservoirs. Mason Farm itself has been turned into the Mason Farm Biological Reserve, managed by the N.C. Botanical Garden to maintain its diversity of habitats.

It's hard to think of anyone —hunter, birdwatcher, or armchair nature enthusiast—who will not enjoy this little treasure of natural history writing.

—*Lawrence S. Earley*

*Donations Still Needed*

## Habitat Foundation Growing

A year-old, statewide organization with the purpose of assisting wildlife agencies and conservation organizations in acquiring, protecting and managing wildlife habitat in North Carolina recently received its largest contribution since it was founded in 1992.

The N.C. Wildlife Habitat Foundation received from the N.C. Wildlife Foundation Inc. $14,000 in cash and almost 800 N.C. Wildlife Resources Commission-issued sportsman's prints and waterfowl prints to be used in raising funds for the organization.

Harrison Stewart of Greensboro is chairman of N.C. Wildlife Habitat Foundation. Eddie C. Bridges, also of Greensboro and a former member of the Wildlife Commission, is executive director.

The Wildlife Habitat Foundation raised almost $100,000 in its first year. Directors at a recent meeting expressed hope that the organization could fund a habitat improvement project in the state before the end of 1994.

Monies contributed to the Habitat Foundation are being invested and only the interest will be used. The foundation is actively seeking contributions on a one-time basis from individuals, businesses and industries.

"We are pleased and excited about this generous gift from the Wildlife Foundation," said Stewart. "This is our largest contribution and it will mean a lot to us. I am certain it will inspire others to endorse and contribute to the fund."

The Wildlife Habitat Foundation was the idea of Bridges who in 1979 envisioned creating an endowment fund for the Wildlife Commission. Information on the Habitat Foundation can be obtained by contacting Bridges or Stewart at P.O. Box 29187, Greensboro, N.C. 27429-9187.

## Wildlife Endowment Fund Report

**February 1994**

Principal Balance
$19,288,630.16
Interest Earned
$13,376,004.50
Total Receipts
$32,664,634.66
Interest Used
$5,175,203.48
Fund Balance
$27,489,431.18

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.

# Improving Pond Fishing

*by Vic Venters*

If fishing isn't up to the standards you desire in the farm pond or small lake you own or fish, take a look at a new video, *Managing Your Pond for Better Fishing*, produced by the N.C. State University Zoology Extension program and the N.C.S.U. Agricultural Communications Department.

The 23-minute video is specifically designed for North Carolina pond owners or pond managers. It covers virtually every topic you need to know about optimizing fish pond management. Key aspects of pond management that are stressed include pond design, water-control design, fish stocking ratios, desirable and undesirable species, harvest ratios, maintaining pond balance, liming and fertilization. It will also show you how to deal with common pond problems such as aquatic weeds, fish kills and muddy water. Also discussed is a section on stocking sterile grass carp for aquatic weed control. Early summer is a good time to tackle some of the problems that crop up in small farm ponds.

The producers have gone a long way toward making the video user-friendly, and production quality is both entertaining and informative. The video was designed to complement the *Pond Management Guide*, an excellent booklet produced by the Wildlife Resources Commission and the Cooperative Extension Service.

Copies of *Managing Your Pond for Better Fishing* are available for viewing at all county Cooperative Extension Service Centers. They have also been distributed to Wildlife Commission district fisheries biologists and assistant biologists, and it is available as well from the audio-visual services branch at N.C. State University. In addition, a slightly different "generic" version has been produced for distribution in about 20 states in the region.

Interested individuals can purchase their own copy by sending a check for $25, payable to N.C.S.U., to: James A. Rice, Extension Fisheries Specialist, Dept. of Zoology, N.C. State University, Box 7617, Raleigh, N.C. 27695.

KEN TAYLOR

Remember your dad
this Father's Day with
a gift subscription to

WILDLIFE
IN NORTH CAROLINA
MAGAZINE

(See the N.C. WILD Store insert
in this magazine for details.)

## Poppers 'n Bream

This is the time of year when bluegills are spawning, and that means they'll strike a cork popping bug just about as soon as it hits the water. See you on the pond.

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Raleigh, North Carolina

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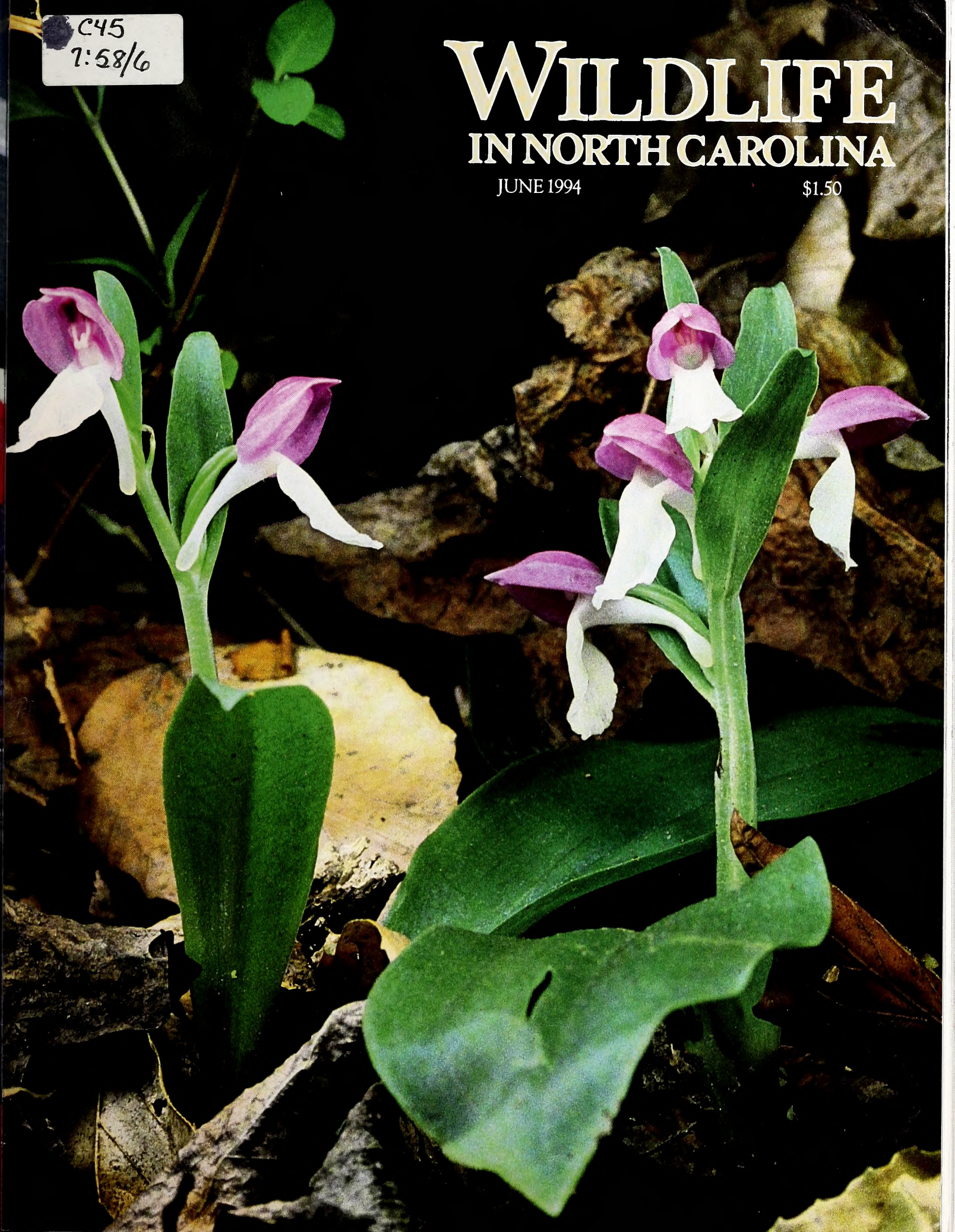
# WILDLIFE IN NORTH CAROLINA

JUNE 1994 $1.50

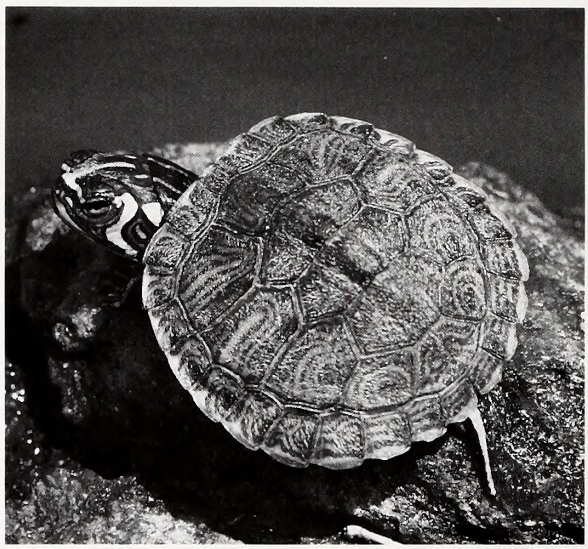


# Benny and Elmo

*by Jim Dean*

I spotted Elmo II drifting in the middle of a pond in mid-April. Elmo turned out to be a yellow-bellied slider about the size of a 50 cent piece—a male, I think. It was very windy, and perhaps he had washed away from the protective shore. I scooped him up, but since I didn't have a bowl handy, I filled one of my shoes with water and put him in it. He sat there all afternoon and watched me catch half a dozen bass that could have swallowed him in a gulp. I showed them to him and explained the risk he was taking. He didn't appear to be impressed.

Late that afternoon, I carried Elmo to a small, fishless frogpond where I've been growing lily pads. It's ideal habitat for a small turtle and needed one.



JIM DEAN

There was a time when I would have kept this little slider in a bowl for a few weeks or perhaps through the summer. But I haven't done that in years because I believe wild animals are invariably better off left in their natural surroundings, and I don't want to be identified with the sentimental "animal lovers" who often do more harm than good "rescuing" baby birds, fawns and other creatures. Besides, it's illegal to keep any wild creature specifically as a pet, although some species may be held in captivity for certain other purposes. You'd still need a permit or license for most species, even those not considered threatened or endangered. The law is complicated, full of loopholes, arguably ineffective and probably needs revising—precisely the kind you don't want to tangle with.

Still, I must confess that whenever I see small wild turtles each spring, I'm tempted to catch them and dig out the old bowl that's probably still somewhere in the attic. My love affair with turtles has been ongoing since the 1950s when I used to buy them at McCrory's or Rose's five and dime. The turtle tanks were always in the back of the store—large aquariums containing dozens of little sliders, cooters, redears or Eastern painted turtles (painted by nature, of course). Often, the backs of those in the tanks had also been painted quite literally with pink, yellow or green enamel, and some even sported decals. Usually, there was a 39 cent tank and a 49 cent tank, the difference being that the bargain turtles were dead or nearly so. I'd pick out the liveliest turtle I could find, then take it home and gently peel the paint off its shell. For years, I kept the same rocks and bowl just for dimestore turtles or for the occasional wild turtle I might catch. The fear of turtle-transmitted salmonella killed the legal pet baby turtle trade years ago, but it would probably have been banned in due time anyway.

My fixation is so ingrained that finding baby turtles is part of a lifelong recurring dream. It's always the same. I'm walking along a creek or pond edge and I see a small turtle. Whoops, there's another one. And, by golly, here's two more. Suddenly, there are dozens, hundreds, thousands of little turtles and I'm on my hands and knees raking 'em in. Then I wake up. I'm always disappointed.

One spring many years ago, I caught two tiny turtles the same day—a yellow-bellied slider and an Eastern painted turtle—and kept them together in a large plastic dishpan until early autumn. The slider was named after a character that appeared in the late Rod Amundson's tall tales. Older readers may recall that Rod was the first editor of this magazine and penned the hilarious adventures of Elmo Cooter and Luke Guppy. I named the painted turtle for English comedian Benny Hill.

During the day, I would often find Benny and Elmo on top of their rock, but they never entirely lost their wariness. When they'd first see me, they would instantly do a terrified double backflip into the water. But no sooner would they hit the drink than it would dawn on them that I was the food guy, and they would eagerly bob back to the surface and wait for a handout. They'd chase down a wounded fly buzzing on the surface, but a wriggling earthworm offered even greater sport. Benny would grab one end, and Elmo the other, then they'd tow each other around, gnawing away, until they'd meet snout-to-snout in the middle.

That September, I turned them both loose in a newly constucted pond where I knew the bass were too small to make a meal of them. Besides, Benny and Elmo had grown considerably over the summer, and I figured they could fend for themselves.

By the time you read this, Elmo II will have forgotten all about his afternoon in my shoe. Still, I hope I get to see him from time to time sunning on a log or lilypad. But even if not, I'll surely be happily gathering wheelbarrows full of his kinfolk in some midsummer night's dream.

I wonder what Sigmund Freud would say about that?

*June, 1994*
*Volume 58, Number 6*

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **Dribbling Contours for Bass**
*written and photographed by Soc Clay* © 1994
*You don't absolutely need a depthfinder to catch bass. Even if you're a high-tech angler, this tactic from the 1950s will add fish to your creel.*

8 **The Scuppernong Runs Through It** *by Vic Venters*
*The Scuppernong River is the centerpiece of an ambitious plan that could save the river, protect vast areas of prime wetland habitat and bring economic prosperity to Tyrrell County.*

14 **Wild Orchids** *photographed by Hal Horwitz* © 1994
*North Carolina's varied climates and habitats host an astonishing assortment of wild orchids, the royalty of the plant world.*

20 **Fishing the Oregon Trail**
*written and photographed by Joe Malat* © 1994
*Fishing can be terrific for a wide variety of species in and around the inlet named for the first large boat that passed through it after the hurricane of 1846.*

24 **Do They Really Have 1,000 Legs?**
*written and photographed by Harry Ellis* © 1994
*Centipedes and millipedes aren't our most sophisticated creatures, but they can get along without stepping on their own feet, thank you.*

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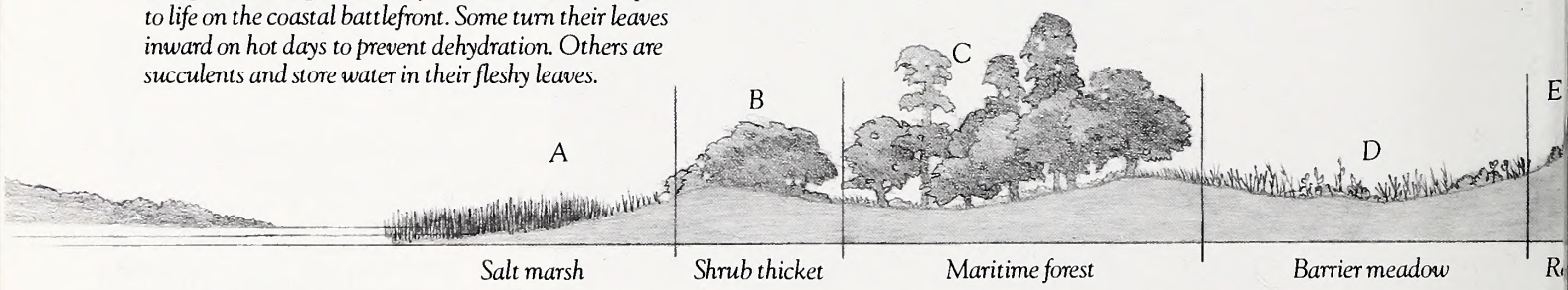
## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*
**Nature's Ways** *by Lawrence S. Earley*
**Back of the Book** *by Vic Venters*
**Wildlife Through the Year** *by Vic Venters*

**Cover** *A pair of showy orchis, one of North Carolina's many orchid species, peeks through the forest floor. Photographed by Hal Horwitz.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

***The plants that grow** on the frontal dunes have adapted to life on the coastal battlefront. Some turn their leaves inward on hot days to prevent dehydration. Others are succulents and store water in their fleshy leaves.*




***The cross-section** of a barrier island is divided into distinct habitats, with plants listed that are adapted to living in each zone.* **Zone A:** *Salt marsh cord grass, black needlerush, glasswort, salt grass, seaside goldenrod.* **Zone B:** *Wax myrtle, bayberry, yaupon, cottonbush, catbrier, morning glory, marsh mallow.* **Zone C:** *Live oak, laurel oak, red cedar, loblolly pine, yaupon, wax myrtle.* **Zone D:** *Salt meadow hay, little bluestem,*

# The Dune Makers

*written by Lawrence S. Earley*
*illustrated by David Williams*

As familiar as we are with the protective dunes that fringe our beaches, how much do we know about how they are made? What keeps the often violent coastal winds from just packing them off to the next state?

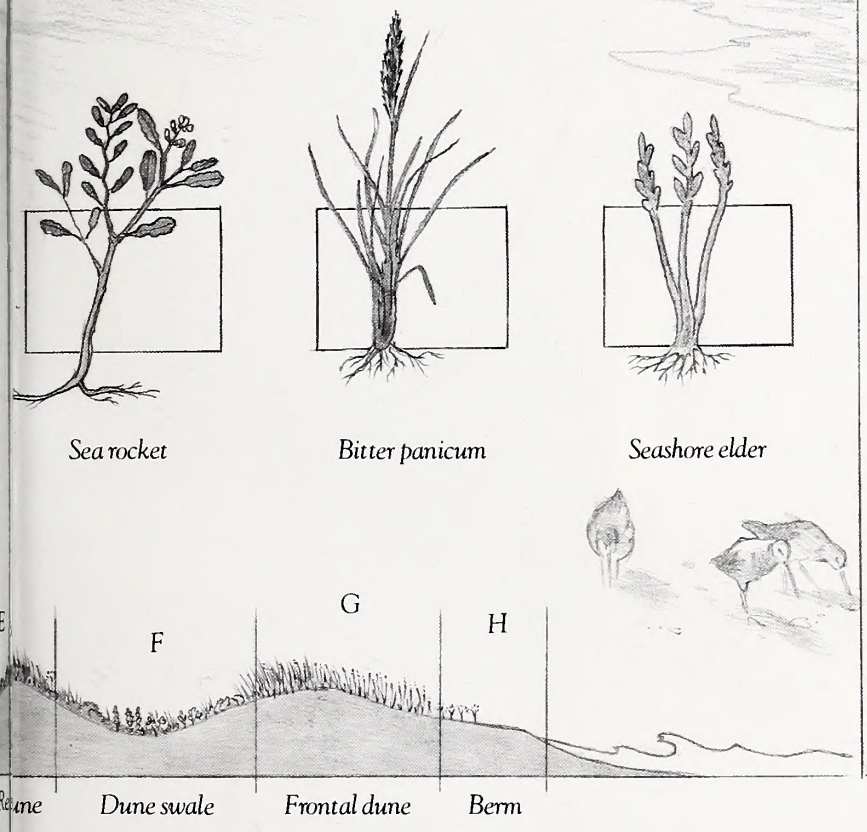
Leaving aside the observation that hurricanes sometimes do just that, the reason that dunes stay put—mostly—is that a group of remarkably adapted plants keep them there. Without these plants, our dunes would be highly unstable, moving about wherever the wind dictated. Such is the case with migrating dunes which are capable of smothering entire maritime forests, as well as cemeteries, roads and houses.

The plants that have adopted this important role of sand trapping and dune building include such dominant grasses as American beachgrass, sea oats and bitter panicum. Other plants with important roles to play are sea rocket, croton, seashore elder and seabeach orach. Hardly a force to be reckoned with, yet these hardy plants do more than any army to keep the dunes from disappearing.

A dune is formed out of the action of wind upon sand. Prevailing breezes constantly carry sand landward across the beach and would strip it away from the beach entirely unless something got in its way, a piece of driftwood, perhaps, or a clump of grass. These obstructions cause the wind to slow and dump its freight of sand. The rising pile of sand creates an even greater obstruction, causing more sand to be piled up.

On diminutive dunes like this one, wind-borne seeds will lodge and germinate. Some of the first colonizers will be the perennial grasses, among them American beachgrass (generally north of Oregon Inlet) and sea oats (generally south of Oregon Inlet). These tough grasses affect both topside and underground

***In the desert-like** environment of the seashore a community of gallant and hardy plants battles corrosive salt spray and wind. They help to stabilize shifting sands and create dunes that protect our barrier islands.*




***A single** seed of a well-adapted grass like sea oats plays a dominant role in creating a sand dune.*

***After the** first year, the grass has sent its roots deep into the sand.*

***Prevailing** winds slow as they play among the grasses, causing more sand to be dropped. A small dune builds.*

***As the** dune rises, other clumps of grass sprout from rhizomes.*

***By the** fourth year, a network of roots spreading horizontally and vertically helps stabilize the dune.*

*white-topped sedge, purple muhly, pennywort, croton, blue-eyed grass, spring ladies' tresses, beach primrose, marsh sedge.* **Zone E:** *Sea oats, little bluestem, wax myrtle, bayberry, yaupon, cottonbush, catbrier, grapes.*

**Zone F:** *Croton, beach primrose, seaside goldenrod, sea spurge, pennywort, golden aster, beach pea, salt meadow hay, purple muhly.* **Zone G:** *Sea oats, American beach grass, little bluestem, bitter panicum, sea elder, seabeach orach, croton.* **Zone H:** *Sea rocket.*

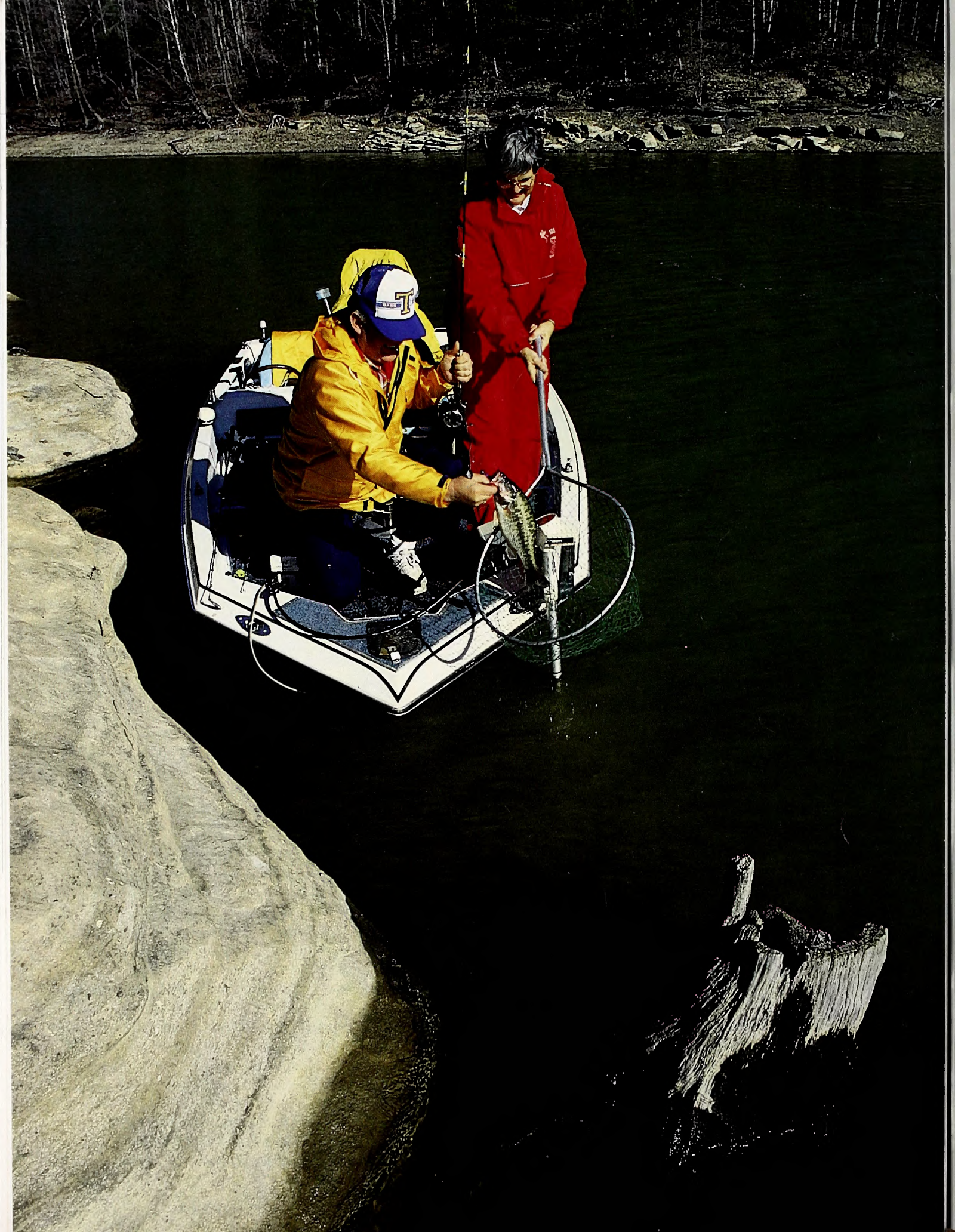
portions of the dune. Below ground, they quickly send out a skeleton-like system of roots and rhizomes that keeps the growing dune together. Spreading horizontally and vertically, the rhizomes sprout additional clumps of grass. Above ground, their collective stems and leaf blades cause more sand to be dropped around them. The dune slowly rises, and so do the grasses. In fact, dune grasses grow even when buried by sand. They seem to be stimulated to grow by the rising collar of sand around their stems.

Other plants appear. The sea rocket, an annual, grows on the berm between the beach and the frontal dune. Its rocket-shaped seed capsules fall down the dune and and are eventually dispersed by the sea to another beach. Seashore elder and sea oats also grow there. Seaside goldenrod, dune spurge, beach pea and seaside evening primrose gather on the dunes. Young woody shrubs may huddle on the protected side of the dune.

Given the harshness of the environment—a scene of abrasive wind, sterile sand, direct sunlight, salt spray, frequent inundation by salt water and little fresh water—how can anything grow at all? The salt spray would kill most other plants, yet this group milks some of its nutrients from the spray itself, as well as from a compost of dead vegetation and other organic litter deposited at the high-tide line. This organic debris can be blown onto the dune where the nutrients are dissolved in rain water and leached into the soil where the roots of the plants hungrily absorb them.

To resist the salt spray and store water, the fleshy leaves of succulents like sea rocket and seashore elder serve the double purpose of storing water and resisting damaging exposure to salt water. Sea oats can roll their leaves inward on hot days to minimize dehydration, a crucial need in this desert. Dune spurge hugs the dune sands closely with its multiple tiny leaves, reducing its exposure to the sun.

Dunes are fragile. Though the hurricanes that frequently blow them out are beyond our control, we can protect dunes best by protecting the remarkable plants that build them.



# Dribbling Contours for Bass

You don't absolutely need a depthfinder to catch bass. Even if you're a high-tech angler, this tactic from the 1950s will add fish to your creel.

written and photographed by Soc Clay © 1994

Perhaps it was because I learned to fish for bass during the 1950s. It was back then that I became a dribble-down bass fisherman. To this day, it's a tactic I apply to fishing for bass almost anywhere I go. It's also the reason I never became addicted to depth finders and most of the other fish-finding devices fishermen now used to catch bass from deep water.

I owned a flasher once, but I had the transducer mounted on the top of the aluminum floor of the boat. My fishing buddies said it didn't work very well, and it didn't stay around long. My youngest son, Tom, who is definitely a modern-day bass fisherman, figured I was too old-fashioned to appreciate the spectrum of electronic fishing aids—real or otherwise. Besides, he argued, the unit would work a whale of a lot better on his bass boat that it did on my old clunker.

At any rate, the fact that I have shunned most electronics is the result of some early influences. Back then, I was fortunate enough to fish with some of the old masters of the sport who knew a great deal about fishing deep water long before it became popular.

A depth finder back in those days was a heavy weight tied to the end of stout line that was marked every 5 feet with a different-colored string tie. Mostly, though, we learned where the best deep-water fishing spots were located by scouting the shoreline in winter when lake levels were down for flood control. We also scouted during midsummer dry spells when power needs caused lake levels to plummet.

Of course, everybody knew you didn't need a depth finder in winter since most of us resorted to dabbling a wad of nightcrawlers along muddy shorelines at the end of a long canepole. We caught a lot of big bass and called the technique "jigging." It was somewhat later that I began to use what I call the dribble-down method for bass, and it still works well even in these days of high-tech bass fishing.

I remember an important lesson I learned about this dribble-down method for bass. It happened about 20 years ago in early summer on Fontana Lake.

My old friend Charley Taylor is a long-time bass fishing guide in the South, and he and I had left the marina at Fontana Village to run up the lake to an area where he had caught bass the week before.

As most who fish this deep mountain lake know, the rocky points are targeted by experienced anglers who catch a smorgasbord of species, including smallmouth, white bass, walleye and even catfish.

Charley and I were after smallmouth on this particular day. He started by carefully positioning the boat on the steep side of a long point covered with chunk rock in the main lake. A tall oak, a jutting rock and a large stump on the shoreline guided us into the correct position some 60 feet or so off the bank.

I couldn't help but ask why we were fishing this side of the promontory rather than looking for a break on the main apex. I figured it was because of the rising wind that was buffeting the surface in exposed areas. Nope, that wasn't the case. Charley figured that bass could be found on almost every point in the lake, but he said that a little exploring is sometimes needed to find the "sweet spot" on a point.

"I learned a long time ago that the steep side of a point is often more productive than the main ridge—if the point runs out onto a field of flat bottom rather than breaking into a creek or river channel," he explained.

The water temperature was about right to hold a bunch of bass at this location that he called a "stop." Charley defines a "stop" as one of three places where bass bunch up during the cooling down and warming up times of the year.

"The way I see it," he said, "bass choose different comfort levels in a lake depending on water temperature, oxygen content and the availability of food. When the water is very cold, bass go to their deepest spots, usually holding to a point or sunken island in the main body of the reservoir. I call this the third stop. Then as water temperatures warm in spring, fish begin to move toward the bank, usually holding on a point located near a favored spawning area. This—like we're fishing now—is the second stop. The first stop, in my way of figuring, is the shallow

***Lakes in western** North Carolina and Tennessee are well-suited for bouncing a jig or spinnerbait down steep, shelving shorelines or points. The technique is especially effective where there are stumps or other woody cover.*

***Rather than use** the rod to take up slack and lift the lure to bounce it down a dropoff, the author and his mentor recommend keeping the rod more or less stationary while controlling the lure mostly with the speed of retrieve. This helps maintain a tight line, making subtle strikes easier to detect.*

cove and bank areas where bass go to spawn in spring and return to feed during autumn."

Depending on the season, Charley believes the majority of bass in a lake will be holding at or near one of the three stops. Since we were past the spawning season, and water temperatures were on the rise, he was betting the fish had returned to the second stop—in this case the steep side of the point.

Charley particularly liked this place because there were several stumps that still clung to three or four small ledges located between 7 and 30 feet deep. Since it was the only wooden cover he'd been able to find there, it was a natural drawing card for bass. Not only was the water deep enough for security from surface dangers, it was also located close to a shallow flat where baitfish and other food sources were located. Equally important, the ledge areas were only a short jump from very deep water—an important need for trophy-sized bass.

We began fishing with his favorite deep-water bass lure, a ⅝-ounce, short-arm spinnerbait dressed with a pork chunk. Charley believes the short-arm spinnerbait is one of the most effective lures for deep mountain lakes.

We first began fishing the point by tossing the hardware near the shore where water depths were about 5 feet. Charley mentioned that it is important that we cover the entire slope of the bank, since it is nearly impossible to predict just where an active-feeding bass will be located. The best way he'd found to cover multilevels of structure and keep the lure in the strike window—he believes the strike zone or window is no more than 12 to 18 inches above the tallest bottom structure—is to slowly bounce the lure down the slope and ledges. This dribble-down technique keeps the lure working its magic within the strike window at each structure level.

It wasn't long until Charley proved he knew what he was talking about. As he was telling me about his bouncing technique, the tip of his rod suddenly dipped down hard!

"There's a nice bass," he grunted, pumping the rod tip once then twice to make sure the hook was driven home.

Moments later, a 3-pound smallmouth came grudgingly to the side of the boat. Charley used a pair of needle-nose pliers to remove the hook without touching its body and released it. He's convinced that if a fish is to be released in warm water, it should never be handled.

Three equally good bass later, I could see that Charley's quarter-century of basketball coaching might have had something to do with the bouncing lure method that he now used for all of his deep-water fishing. Charley's preference for dribbling a spinnerbait actually came about because he learned early on as a guide how to handle the varied skills and idiosyncrasies of a multitude of customers.

He felt that the new spinnerbait lures that were at that time just beginning to show up in tackle shops could be the answer, even for angler customers who might be fishing with artificial lures for the first time.

Traditional bass plugs that were being marketed during that period were difficult to crank down to depths where the fish were hanging out in the big reservoirs and even more difficult to keep at such depths for any

length of time.

"When my clients would get a lure down to the strike window, they would invariably get hung on the tangle of stumps and other forms of cover that were left on the bottom when the lakes were impounded," Charley recalled.

In a day's fishing, several lures would usually be lost, and many of his clients weren't exactly happy about breaking off a lure that might have been in the family for 20 or 30 years. The solution lay in the use of the spinnerbait. Early spinnerbaits such as Bomber's Bushwhacker and Jack's Duel Spinner were his first favorites because they had metal bodies heavy enough to get down to the depths where bass were holding, and the wire arms made them largely snagless when they were hopped across the bottom.

He also began fishing hair jigs early on. They were called a "fly and rind" at the time because anglers used a pork rind to give the bait a little action. They became a stable tool for Charley's dribble-down method of bass fishing.

Over the years, Charley has continued to develop techniques with various lures for both largemouth and smallmouth bass, but invariably, he comes back to his old-time favorites—the jig or spinnerbait—for most of his deep-water angling needs.

The key to catching bass on the contours is to keep the lure in the strike zone as much as possible. For Charley, this zone is no more than a foot or so above the tallest structure on the bottom. "Even in shallow water, the zone is still only about 12 inches tall," he said.

Charley believes one of the biggest mistakes that fishermen are guilty of is manipulating the speed and action of a spinnerbait or jig with the tip of the rod. He maintains complete control by keeping his rod tip at a 45-degree angle during the retrieve. The speed of the retrieve, including stops and starts, is manipulated by speeding up and slowing down turns of the reel handle. Not only does this method allow for an instant reaction when a bass bites the lure, it also better controls line slack. That's important since most strikes happen while the lure is falling.

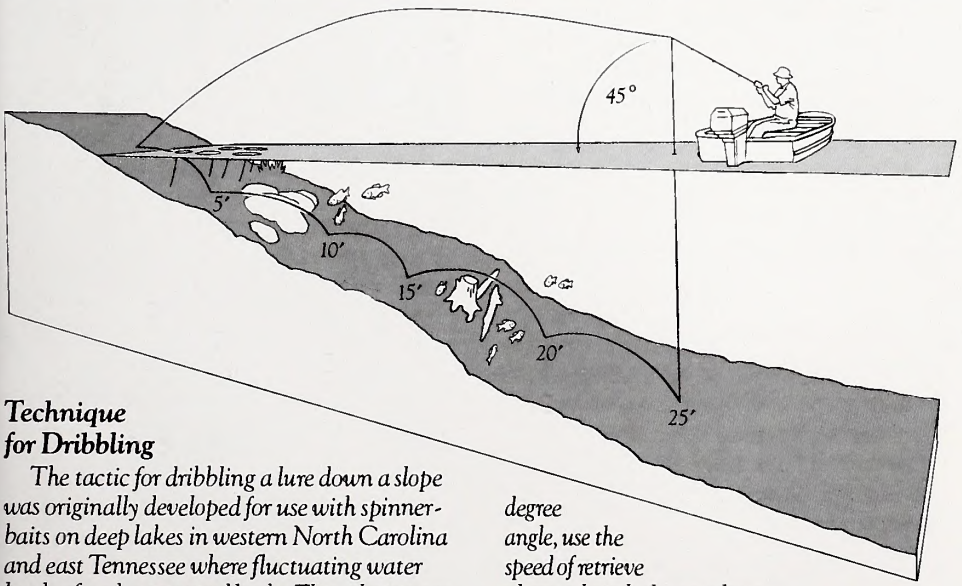
The bouncing technique can actually begin on the bank in some instances. By casting the lure a foot onto the bank, the first bounce occurs when the lure enters the water quietly enough to attract the attention of any shallow-prowling fish. In fact some of the biggest bass I know about have been caught using this technique with plastic worms. It is especially effective at night when entries into the water can be as soft or as a snake or as splashy as a frog entering the water.

Charley believes the second bounce-and-swim should take the lure into about 3 to 5 feet of water, depending on how deep the ledge, flat or bottom structure is located. When fishing in water that runs down to about 25 feet, he likes to bounce the lure five times during the retrieve. Lifting and lowering the lure not only gives a little extra action to its movement, the procedure also tells the fisherman that the lure is doing its stuff in the critically narrow strike zone throughout the retrieve.

His rule for dribbling a spinnerbait is to select a long-arm, tandem-blade model for fishing in water from 1- to 5-feet deep. He likes a long-arm, single spinner design for depths ranging from 5 to 12 feet. The short-arm models work best in water deeper than 12 feet.

Bass fishing in deep water has always been a mystery to many fishermen who still often throw the shallow-runners at the bank. But Charley believes with a little practice and some determination, the angler who attacks the points with the dribble-down method will soon learn that successfully fishing for bigger bass can be an almost year-round sport in North Carolina. And you don't need a fancy depth finder to do it. ☐

***The tactic of** dribbling a lure down a dropoff is effective not only for largemouth bass, but also for smallmouths. Indeed, it's one of the best ways to catch big smallmouths like this one.*




### *Technique for Dribbling*

*The tactic for dribbling a lure down a slope was originally developed for use with spinnerbaits on deep lakes in western North Carolina and east Tennessee where fluctuating water levels often leave exposed banks. The technique can be adapted to other types of lakes, and will also work with lures like the pig 'n jig. Where possible, the lure is cast onto the edge of the bank, then hopped into the water. While holding the rod at a steady 45 degree angle, use the speed of retrieve alone to hop the lure at about 5-foot intervals down the bank. It's easier to detect strikes because the line is never totally slack. Try to hop the lure over or very near any stumps or other woody cover.*

# The Scuppernong Runs Through It

## The Scuppernong River is the centerpiece of an ambitious plan that could save the river, protect vast areas of prime wetland habitat and bring economic prosperity to Tyrrell County.

by Vic Venters

One hundred yards back in the river swamp, the small stone obelisk seems as incongruous in its setting as a cypress tree in the desert. Like a misplaced monument to a lost Pharaoh, the marker rises from a bed of pine straw and muck under the canopy of century-old loblolly and Atlantic white cedar. There are initials carved on each side and a date reads 1916 below the letters R.C.W. "Look around you," says Bill Barber, the Weyerhaeuser employee who owns the land on which it sits, "no roads, no houses, no people. It took a lot of work to haul this in here. What would you think if you stumbled across it?"

Except for scattered wood duck boxes and a few herring nets strung in the shallows along the river, the obelisk is the first sign of human presence we've encountered since leaving Columbia in a johnboat 8 miles down the Scuppernong River. Old canals a little farther upriver are another clue that man's hand was once at work on the river—passages cut through swamp forest to bypass twisting oxbows that once slowed lumber barges and river trade. But the canals are healing now, unused and slowly filling with silt and fallen trees.

On the trip to Barber's land, we pass ancient cypress trees, misshapen giants whose life span is measured in centuries, perhaps even a millennium. Here and there stands of Atlantic white cedar—locally called juniper—peek through the curtain of tupelo and other gums that forms the bulk of the riverine swamp forest. Because of its undisturbed state and now-rare juniper stands, the N.C. Nature Conservancy has called the Scuppernong's 26-mile flood plain forest a wetland of "global significance."

The quiet character of the Scuppernong today belies its bustling history. The obelisk and canals are testament to that. The obelisk is actually a property line marker, a battlefield reminder of sorts left from the turn-of-the-century "cedar wars" when the John L. Roper Company and the Richmond Cedar Works vied for logging rights to the vast juniper

***Columbia's quiet** waterfront—which bustled at the turn of the century (above)—may become a national model for reconciling natural resource conservation with economic growth. The area just south of the Highway 64 bridge is the site for the planned Center for the Sounds project, a major public/private venture designed to bring nature-based tourism and sustainable development to Albemarle Pamlico region. Since this photo (right) was taken in 1991, the smaller bridge (top of photo) has been removed.*

KEN TAYLOR

## Center for the Sounds/ Scuppernong River Greenway

*The Walter B. Jones Center for the Sounds project will serve as a gateway to the Albemarle-Pamlico region's abundant natural resources, including Phelps Lake and the Pocosin Lakes National Wildlife Refuge. Several private conservation groups and foundations, as well as state and federal resource agencies, have worked to purchase land along the Scuppernong River corridor. Success will hinge on river cleanup, regional planning, adequate funding and balancing the goals and objectives of disparate groups of natural resource users.*

- Pocosin Lakes National Wildlife Refuge
- Nature Conservancy
- North Carolina 4-H
- National Fish and Wildlife Foundation Acquisitions
- General Location of the Scuppernong River Greenway

***This stone obelisk*** *is a boundary marker from the turn-of-the century "cedar wars" in northeastern North Carolina when timber companies vied for rights to log Atlantic white cedar from the area, producing one of the last economic boom times for the region.*

VIC VENTERS

stands that in the 1890s still blanketed more than 200,000 acres of northeastern North Carolina and southeastern Virginia. At the turn of the century, the lightweight, durable wood was in high demand for housing shingles and boat lumber, and competition was fierce to log juniper out of what previously had been "worthless" unmarked swamp.

Where property boundaries were vague or poorly marked, Roper and RCW battled, taking each other to court on numerous occasions. The feud, though, was more than mere business rivalry; it was a clash of cultures. John L. Roper had been a Union Cavalry captain while the Richmond Cedar Works was headed up by an ex-Confederate cavalryman. So bitter was the dispute that when one company built a railroad to carry out juniper the other company tore up the tracks before logging could begin.

The "cedar wars" finally ended in the World War I era when the companies agreed to compromise on disputed areas. Permanent markers were established to mark boundary lines and, like R.C.W.'s 1916 obelisk on Bill Barber's Scuppernong property, many still dot the woodlands of northeastern North Carolina.

The logging boom from the "cedar wars" era was in many respects the last financial hurrah for Tyrrell County and Columbia. When most of the last commercially harvestable juniper stands were cut by the early 1930s, they were not replanted. The lumber mills shut down one by one, and in 1948 rail service to Columbia ended. Prosperity gradually bypassed the county, driving through it to the Outer Banks. The Scuppernong and Columbia, once busily plied by lumber barges and river trade, grew quiet.

Today, Tyrrell is the state's poorest, least-populated county with chronic high unemployment averaging over 20 percent. Industry is non-existent, and the county's populace of about 4,000 depends on seasonal work in nearby Dare County or on equally low-paying agricultural jobs. Undevelopable wetlands comprise nearly 85 percent of the county. Moreover, because of bleak economic prospects, the county has been hit with a "brain drain" on its youth—with many younger residents leaving the area for greener pastures.

But these days the sleepy Scuppernong once again shows signs of becoming an economic artery, the centerpiece of an ambitious "sustainable development" plan designed to return prosperity to Tyrrell County. This time, however, instead of relying solely on exporting commodities like timber, the recovery plan is based on importing "eco-tourists"—visitors interested in enjoying the area's largely unspoiled natural resources.

In 1988, Columbia was named as a Coastal Initiative Community by then Gov. James Martin as one of five waterfront communities needing special economic attention. By the late-1980s, Tyrrell County and the town of Columbia realized that the lack of a highly educated area workforce and restrictions on

land use from environmental regulations would preclude the development of a local manufacturing or business-based economy. A Coastal Initiative Committee study of the region's economic prospects, however, concluded that the town and county could develop the local economy by courting and encouraging nature-based tourism.

The drawing card would be the unspoiled landscape of the Albemarle Pamlico peninsula, rich in natural resources including several national wildlife refuges, state parks, the Intracoastal Waterway, Albemarle Sound, the Alligator River, Phelps Lake, Mattamuskeet Lake and the Scuppernong River, among others. There was also another unexploited resource: about 5,000 cars traveling through Tyrrell County and Columbia on U.S. 64 each day on their way to vacation Meccas on the Outer Banks. On average, that added up to more than 1.4 million tourists passing through the town and county each year.

The problem was that very few cars—meaning tourist dollars—were stopping in the county. There was no magnet in quiet Columbia to draw them in. But prospects for an economic revival based on nature tourism were enhanced in 1988 when the Arlington, Virginia-based Conservation Fund, working on behalf of the R. K. Mellon Foundation, outbid Japanese peat-mining investors for the old First Colony Farms megafarm area, 104,000 acres of land that had been cleared in the early 1980s in a misbegotten attempt to begin peat mining in the area. In 1990, the Conservation Fund donated the land to the U.S. Fish and Wildlife Service and the Pocosin Lakes National Wildlife Refuge was born (See "A Look At Our Newest Refuge," August 1991).

When the federal government obtains large acreages in rural areas, resentment from local citizens is inevitable as local tax revenues are lost and development prospects dimmed. The new refuge, for example, removed 49,000 acres from local tax rolls in Tyrrell County alone. But instead of fighting the refuge, Tyrrell County and Columbia joined forces with the Conservation Fund, the U.S. Fish and Wildlife Service and a host of other backers to develop a workable nature-based tourism strategy.

"We've got a beautiful scenic river, a quaint waterfront town, an abundance of boating, fishing and sailing opportunities and a variety of wetland habitats," said J. D. Brickhouse, Tyrrell County's administrator. "We've recognized that these natural resources are our main asset and the wildlife refuge has the potential to attract tourists and school groups." No one expects an overnight boom, but Brickhouse and other refuge supporters hope that increased tourism can create and eventually support a thriving small business economy—small inns, restaurants, canoe liveries and a restored waterfront that caters to visitors.

As envisioned, nature-based tourism is the most feasible way to improve the local economy and still be compatible with the conservation of the region's natural resources. "Traditional tourism has generally altered the character of a place and displaced the local residents," writes the Conservation Fund. "In contrast, ecotourism preserves and enhances both the natural integrity and cultural identity of the region."

But for this type of strategy to work, the area's refuges, parks and other natural resources had to be accessible and attractive to tourists. In 1991, the town and county began seeking congressional funds to build a refuge visitor's center in Columbia while the Conservation Fund began private fund-raising efforts and land acquisition efforts.

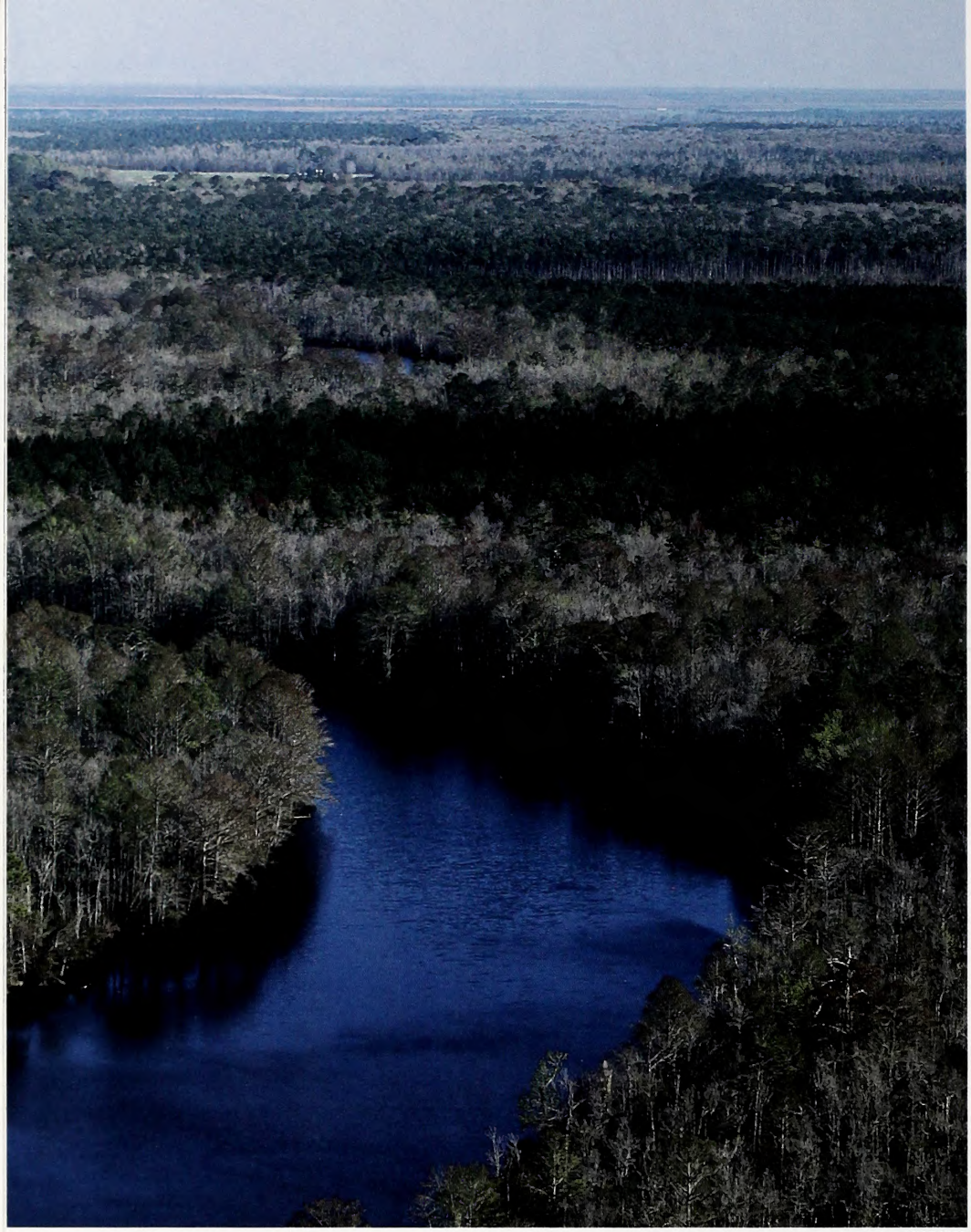
The effort quickly garnered early political support from the late Congressman Walter B. Jones and others, and the town began a new waterfront boardwalk and other aesthetic improvements. Tracts of land were acquired along the Scuppernong by the Nature Conservancy, the Conservation Fund and the National Fish and Wildlife Foundation (see map).

Since 1991, the scope of the project has grown to include an environmental education component and a more comprehensive sustainable development strategy designed to empower local citizens for economic revival. Spearheaded by the town, county and the Conservation Fund, the Walter B. Jones Center for the Sounds project, as it is now called, has garnered extensive support from state and federal agencies, private foundations such as the Z. Smith Reynolds Foundation, the John and Anna Hanes Foundation and the Kathleen Price and Joseph M. Bryan Family Foundation, and numerous conservation groups.

The sustainable development strategy has four separate components. A Pocosin Lakes National Wildlife Refuge Visitor Center will serve as the gateway to the region's five national wildlife refuges and state parks. A Center for the Sounds Environmental Education facility will include classrooms, auditoriums, laboratories and a residential complex for students and educators. The Tyrrell County Community Development Corporation, a local private, non-profit community-based organization was created to plan, oversee and implement sustainable development strategies. And the Tyrrell County Youth Conservation Corps, a new youth employment corps, was created to provide job training and local summer jobs to the area's young residents. The Youth Corps has already worked on community rehabilitation and nearby conservation-oriented projects.

***A requisite** for success in developing nature-based tourism is promoting the various region-wide attractions of the Albemarle Pamlico area. To this end, the Conservation Fund has developed the Scuppernong Greenway, a series of canoe and pedestrian trails that link the river, Pocosin Lakes National Wildlife Refuge and historic Columbia with Somerset Place Plantation (pictured) on Lake Phelps.*

KEN TAYLOR



KEN TAYLOR

***The Scuppernong** River remains home to some of the finest remaining stands of Atlantic white cedar in the Southeast. While water quality in the river needs improvement, the forested river corridor of cedar, gums and cypress remains largely intact along its length.*

This spring, Congress authorized construction for the Center for the Sounds, although at presstime the timetable for federal appropriations for the $7 million center remains uncertain. In the meantime, ground has been broken on a smaller visitor's center—an historic Episcopal parish house is being moved from downtown Columbia to the Center for the Sounds site on an adjacent tract of land. Construction is also proceeding on an interpretive walking trail that will wind through riverine wetlands sites. "The creation of the local visitor's center will give us a nucleus to go ahead with the environmental education program and get it rolling," explained J. D. Brickhouse. "The Partnership for the Sounds is currently developing the environmental-education curriculum that will be available for school programs by the fall of 1995."

In the past year, the Conservation Fund has also developed the Scuppernong River Greenway, a 27-mile long network of trailside exhibits, canoe trails, pedestrian paths, interpretive walks and bicycle trails. In addition, a major 4-H environmental education center will be located at Bull's Bay at the confluence of Scuppernong at Albemarle Sound. Land has been acquired and design of the center is underway.

As ambitious as these plans are, the Center for the Sounds is only one of four similar regional projects being developed under the umbrella of the larger Partnership for the Sounds, a cooperative public/private effort formed in 1992 to foster a regional economic strategy by bringing environmentally sustainable development to the Albemarle-Pamlico peninsula, the second largest estuarine ecosystem in the eastern United States and an area that is now being touted as a "bioregional megasite."

A regional strategy was necessary for several reasons. Unlike the beaches of the Outer Banks, the Albemarle-Pamlico peninsula lacks any one striking attraction. Its charms, by contrast, are visually less spectacular and spread out across the region. No one attraction is likely to draw visitors. A cooperative strategy also means that public funding will not be duplicated on similar efforts. Plus, adds Brickhouse, also the chairman of the Board for the Partnership for the Sounds, "We do not need four or five major facilities vying with each other for the same dollars." The Partnership for the Sound projects all stress environmental education but each has a slightly different focus. At present they include:

- The Walter B. Jones Center for the Sounds in Columbia will provide a gateway to the wildlife refuges and parks and will emphasize wetlands education.
- The Estuarine Education Center in Washington will be modeled on the state's marine aquariums but will focus on the Albemarle-Pamlico estuarine ecosystem. Construction is expected to begin this year.
- Planned restoration of the Lake Mattamuskeet hunting lodge and pumping station for conferences and environmental education laboratories.
- A proposed visitor's center for the Roanoke River National Wildlife Refuge in Bertie County.

In a separate but thematically linked initiative, the Conservation Fund is also developing a series of large-scale greenway plans for North Carolina, including what the group is calling the Albemarle-Pamlico Bioregional Greenway. These projects will identify, map and plan conservation strategies for significant natural, historical and cultural important resources.

The projects have national, perhaps international, implications. "Conditions in Tyrrell County mirror those in other poor, rural counties in which the U.S. government is the primary landowner," writes the Conservation Fund. "The abundance of natural and cultural resources is in direct contrast to the lack of economic opportunities." If these projects succeed, say supporters, they offer a great chance to prove that environmental protection in a poor region can simultaneously foster economic growth. Their success may also ease some of the mistrust of federal land management. "If we can create an economy based on conservation," said Page

LAWRENCE S. EARLEY

***Along the** Scuppernong, only inaccessible stands of Atlantic white cedar—locally called juniper—were not logged out. After cutting, juniper is difficult to re-establish, in part because deer over-browse the tender seedlings (right). This helps explain the tree's scarcity today.*

Crutcher, the coordinator for the Center for the Sounds project, "then it will be in people's best interests to support the conservation of natural resources."

But will it work?

Studies by the Institute for Economic Development at UNC have identified several requisites for success. "Because the strategy promotes multiple attractions throughout the area, regional intergovernmental cooperation is a must," writes Matthew Sexton of the Institute's Department of City and Regional Planning. Money—or the lack thereof—will also play a pivotal role. "The real key to success for the Center for the Sounds will be getting funding," adds Brickhouse. "Political support at state and congressional levels is strong, but budgetary constraints are real. We'll just keep working at it."

Assuming funds are found, there remains substantial structural, economic and societal challenges to overcome. Take ecotourism in Tyrrell County. The Scuppernong's water quality has been identified as a potential impediment to the ecotourism strategy. Currently, the river is neither clean enough to support nurseries for three out of four river fish species nor is it safe to swim in. The river has high levels of fecal coliform bacteria, pollution which comes from a host of point and non-point sources. Most apparent is Columbia's overloaded wastewater treatment plant, which has frequently been unable to comply with permitted levels of discharge.

Columbia's new wastewater treatment plant, expected to be on-line in the fall of 1995, will alleviate some, though not all, of the Scuppernong's water quality problems. Agricultural runoff, particularly runoff from local hog farming operations, is suspected as being another contributor to the river's poor water quality. Pollution problems have been compounded by the nature of the river itself—the Scuppernong has no lunar tide to flush out the basin on a regular basis, depending instead, on a wind tide.

A central challenge facing ecotourism supporters will be developing a course of action that integrates the Scuppernong's cleanup without completely alienating local agricultural concerns, which is the area's current economic backbone. At present, hog farming makes up about 40 percent of the local farm economy.

"We believe in non-confrontational approach regarding the Scuppernong," said Mikki Sager, a program coordinator at the Conservation Fund. "Rather than pointing a finger at people we are trying to approach the issues with the attitude of what can we do to improve the situation. It's like anything else in life—taking extremes on positions is going to leave bad feelings."

One innovative approach for improving water quality is using some of the area's abundant wetlands as filters for agricultural runoff. A project under way at the Pocosin Lakes National Wildlife Refuge may provide a model. Managers at the refuge have already installed new water control structures in the refuge's complex network of dikes that will allow the Fish and Wildlife Service to run surface water over land in some locations to existing wetlands where it will filter slowly through existing pocosins into the Alligator River. "We inherited a lot of water management problems when we got the land," says Jim Savery, the refuge manager for Pocosin Lakes National Wildlife Refuge. "We should be able to alleviate some of the drainage problems that have affected us and neighboring landowners."

Given the bitter factionalization taking place today between the various constituencies that use or depend on natural resources, one of the greatest challenges may come in the arena of people management—that is, avoiding a "clash of cultures" between visitors with essentially urban concepts of eco-recreation and local residents whose lifestyle reflects traditional rural values and use of natural resources. And, clearly, local citizens will also have to eventually see real benefits from the proposed strategy, all the while guarding against the emotional swings of overexpectation or pessimism.

In the end it may do well to return to the "cedar wars" obelisk up on the Scuppernong. Two companies, headed by former enemies, were able to come to terms, after a long and difficult struggle, for what at the time provided economic benefit to all. The creation of the Center for the Sounds project is far more complex, of course, but for successful implementation it will take the conciliation and cooperation of people and groups whose aims and goals have often been mutually exclusive. If it works, the monument they share will not be small nor made of stone, but will be a prosperous community and a conserved environment.

YEAR OF THE COAST

# WILD ORCHIDS

North Carolina's varied climates and habitats host an astonishing assortment of wild orchids, the royalty of the plant world.

photographed by Hal Horwitz ©1994

Dragon's Mouth *Arethusa bulbosa*

Small Yellow Lady's Slipper *Cypripedium pubescens*

***Though the** dragon's mouth (far left) and the lady's slipper look different, they have the same flower structure. All orchids have three sepals and three petals, although they are often so modified that it's difficult to find them. The dragon's mouth grows only in a few mountain bogs in North Carolina, although it is more abundant in northern states. The yellow lady's slipper was immediately recognizable to the first European explorers here because a close relative also grew throughout temperate Europe and Great Britain.*

# WILD ORCHIDS

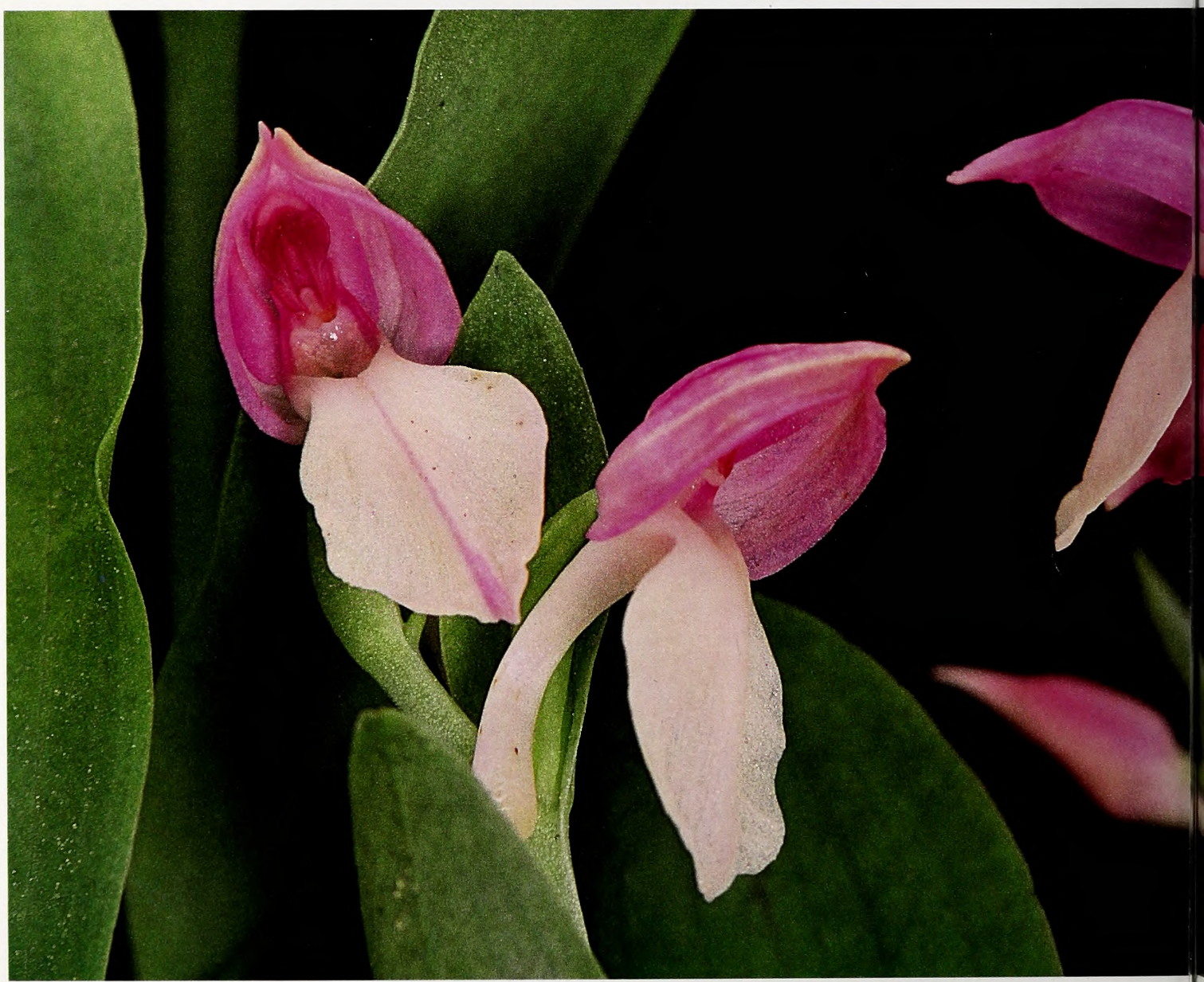
About seven years ago, Virginia photographer Hal Horwitz set himself a daunting task: to photograph the more than 200 species of North American native wild orchids. Since then, he's tracked down 120 species, including all but one of North Carolina's 60 species.

Why orchids? The question has a simple answer for Horwitz. "Orchids are the royalty of the plant kingdom," he says. "They have a mystique and an unusual beauty about them that makes everyone sit up and take notice. They come in so many shapes, forms and colors that you know intuitively that they are special."

Most experts agree that between 20,000 and 30,000 orchids grow around the world, making them one of the two largest plant families. They have been able to adapt to almost every habitat on earth, from the Arctic Circle to the tropics, and they grow on every continent except Antarctica. North Carolina has many more wild orchids than Hawaii, reflecting the state's varied habitats and climates. Southern species find themselves at home along the warm and humid coast while some orchid relics of the last ice age have established footholds in the mountains.

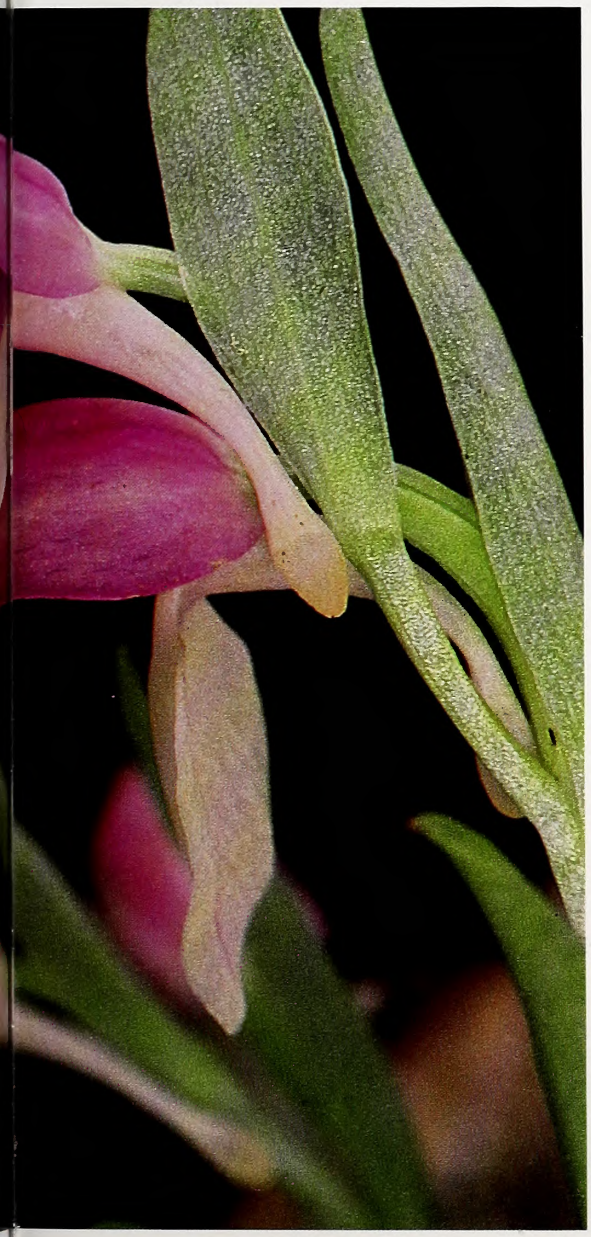
Horwitz uses a tripod-mounted 35mm camera to take his breathtaking pictures. To get up close, he employs a variety of macro lenses, mainly the 105mm. Like most photographers, he loves overcast days for picture-taking, but sunny days don't stop him. "I use ripstock nylon as a tent over the plants," he says. "That way, I can make my own overcast day."

Enjoy the fruits of Horwitz's obsession—the allure of the regal orchid.



Crested Fringed Orchid *Platanthera cristata*

Crested Coral Root *Hexalectris spicata*

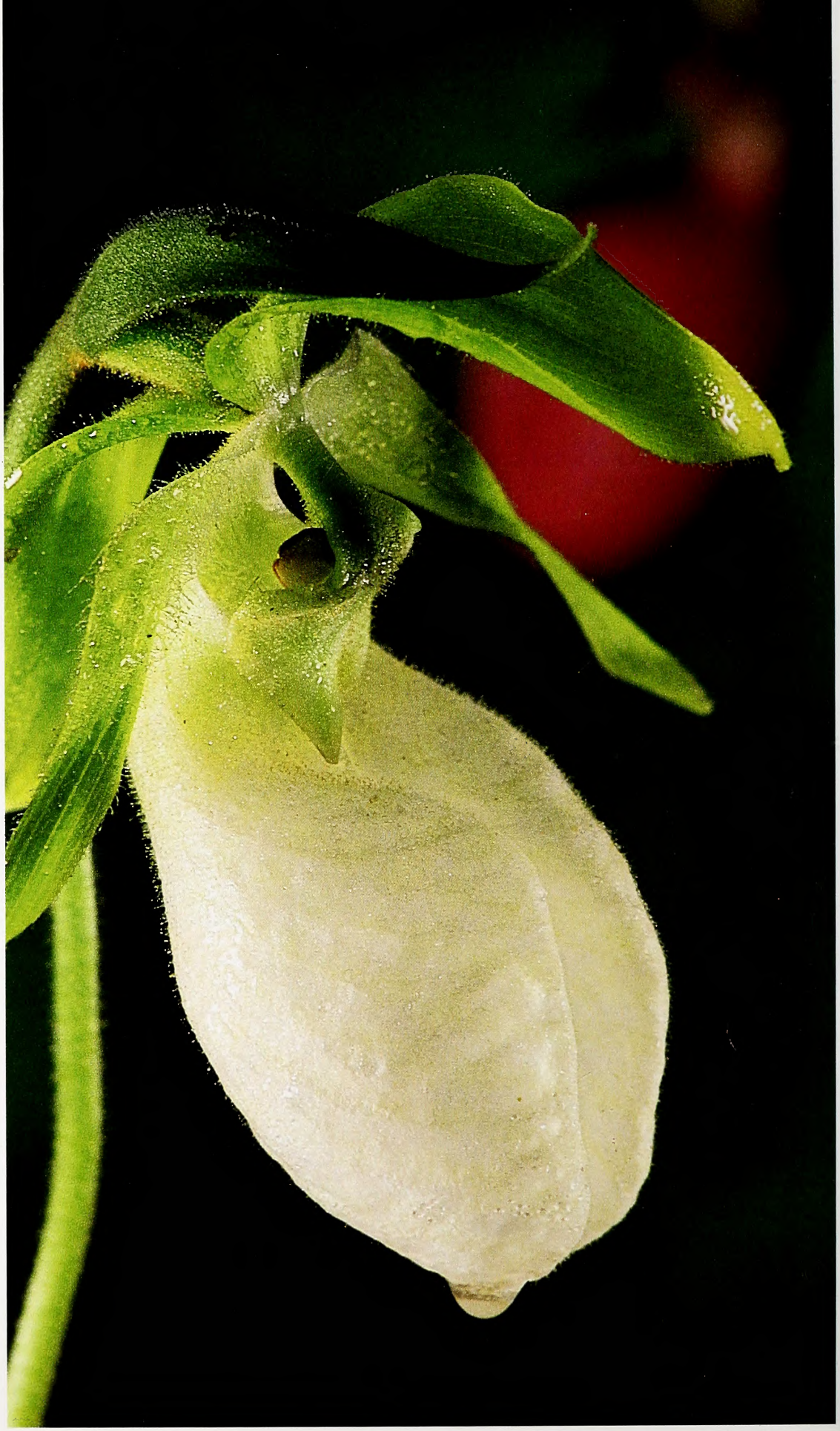


Showy Orchis *Galearis spectabilis*

**Not all orchids** *are as showy as the showy orchis (left). The crested coral root (above) is one of several small and even insignificant-looking orchids. Because it lacks green leaves, it cannot photosynthesize and derives most of its nourishment from dead organic material. Coral roots were named because their roots reminded early plant hunters of beaded coral. The* Plantanthera *genus (top left) is well represented in North Carolina, with 13 species found here.*

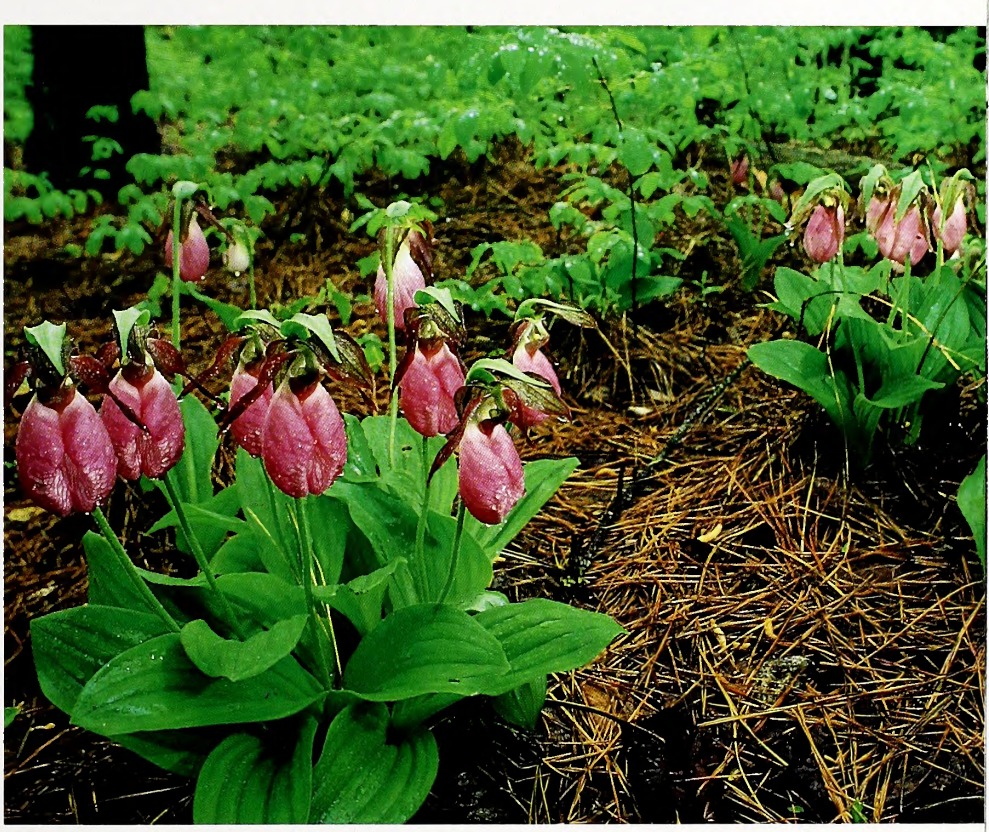
# WILD ORCHIDS

**The buds of** the pink lady's slipper are white and turn pink (far right) as they mature. It is one of the most widespread of wild orchids in North Carolina. This lady's slipper is pollinated only by queen bumblebees early in the spring. The albino form of the pink lady's slipper (right) is a rarity. Spiranthes, the genus name of the spring ladies' tresses (top left), comes from two Greek words meaning "coil" and "flower," describing the characteristic spiral arrangement of flowers around the stem. The spreading pogonia (bottom right) is commonly encountered in the rich, regularly burned longleaf pine savannas.



White Pink Lady's Slipper *Cypripedium acaule var. alba*

Grass-leaved Ladies Tresses
*Spiranthes vernalis*



Pink Lady's Slipper *Cypripedium acaule*

Spreading Pogonia *Cleistes divaricata*

*Hal Horwitz is a dentist from Richmond, Va. whose avocation is photography. He was drawn to nature photography by a workshop taught by* Wildlife in North Carolina *photographer Ken Taylor.*

# Fishing the *Oregon* Trail

Fishing can be terrific for a wide variety of species in and around the inlet named for the first large boat that passed through it after the hurricane of 1846.

written and photographed by Joe Malat ©1994

I visited Hatteras Island for the first time on a cool, wet Memorial Day weekend in 1965. I was 15. My dad drove us from Richmond to sample some of the fantastic Outer Banks surf fishing we'd heard so much about. On that weekend, the weather was awful, the fishing worse. But I recall that I had fun on an out-of-town adventure with my father that brought us closer together. And I also remember the drive across Oregon Inlet over a brand new, squeaky-clean bridge completed only the year before.

Since then, the bridge and the inlet have engaged in a roller-coaster relationship that has ranged from adversarial to symbiotic, while both have struggled to exist.

Oregon Inlet was formed during a hurricane that raged across the Outer Banks on September 7, 1846. Water was piled high in the sound, pushed by the strong winds. When the eye of the storm passed, the water suddenly came rushing back and it had to go

somewhere. It flooded the marshes, overran the beaches, and scoured a passage that has remained opened ever since that September storm. With time, the waters deepened as the sound flooded and drained with the daily tides. Soon the waters became deep enough to be safely navigated, and the first large boat to pass through this inlet was a vessel named the *Oregon*, an unlikely namesake for an East Coast inlet. Today's inlet has migrated a considerable distance south of the original location, as the sand has built up on the north side of the opening and eroded from the south side. But that is a typical behavior of most East Coast inlets.

Despite, or possibly because of, its history of constant change, this dynamic inlet has a reputation for being one of the most productive sport fishing areas along the entire Atlantic Coast. The reputation is well deserved. Oregon Inlet is a gateway to some of the best offshore fishing to be found anywhere. Ore-

***Gray trout like*** *these are among the many species anglers can expect to find in and around Oregon Inlet. What you catch often depends on the season, but something is likely to be biting much of the year if you know where to look and what to use.*

***Various types of** jigs with soft plastic tails are almost always good choices for a variety of species, but even these older style bucktail jigs can be deadly if you tip them with a strip of squid.*

gon Inlet also offers some fantastic fishing opportunities for anglers with small boats who have enough prudence to stay within the protected waters that lie to the west of the Herbert C. Bonner Bridge. That's an important point. The captains of the large, ocean-going sportfishing boats are seasoned veterans who know their craft. They exhibit prudence and good judgement. Anglers in small boats (anything less than 20 feet) have no business even crossing this inlet on any but the calmest of days, and they should certainly be thoroughly familiar with the waters before venturing out into the ocean. Folks who have been out to the sea buoy in their bass boats and johnboats will scoff at this comment, but I believe they are taking a chance that no fish in the ocean is worth.

A variety of species of fish call Oregon Inlet home during the course of the year. Some fish are just passing through as they move in or out of the inlet, others spend several months in the area.

Jumbo bluefish usually stay out in the ocean during their spring and fall movements up and down the beach, but they will make occasional forays into the inlet's protected waters. I have seen them chasing menhaden only a quarter of a mile inside the bridge, while several boats, unaware of the "blitz," steamed past the feeding fish and diving birds. Meanwhile I caught and released the choppers until my arms were weary. In the spring, I have seen blues, usually small groups or singles, cruising the shoals along Davis Channel and Crab Slough. They crashed my topwater plugs in crystal clear water only 2-feet deep. Big blues can be very unpredictable, but can make an appearance inside the inlet during late April or early May, and again in November or December.

Flounders are much less exciting, but far more dependable, and they always provide me an opportunity to put a few fillets in the freezer. Prime time is late May to early June, but some bigger fish usually make a showing again in the fall. Flounders bite best in clear water, and boaters can score with them by drifting squid strips or minnows on bottom rigs and double bucktails. In terms of keepers, flounder fishing has been disappointing for a couple of years, but the picture looks brighter for the future. When the little fish grow up, we should have some banner seasons.

Flounder fishing is usually best very close to the inlet, usually west of the bridge, right along the edges of drop-offs or in the deeper channels. The far west end of Davis Slough, where the water depth decreases suddenly, can be good if the water is clear. The ocean side of the bridge, near the rock jetty on the south side of the inlet can also hold some real doormats in the early fall. These bigger fish are best fooled with live finger mullet.

Spot, croakers, sea mullet and a variety of other bottom feeders such as pigfish and blow toads can please boating anglers throughout the summer. This is great fishing for kids, or just about anyone who simply likes to feel a bite and crank in a few fish. They're not big, but they are plentiful. Deep holes, or any of the sections of bottom that are sprinkled with oyster shells are the best bet for these critters. A small piece of bloodworm, or fresh shrimp on small hooks will set the stage for success. This "potluck" fishing can also offer a few surprises from puppy drum, small blues and speckled and gray trout.

Spanish mackerel are summer visitors that show up along the Outer Banks when the water warms and return south in the early fall. Mostly they are found outside the inlet, but by late August fair numbers of them will move back into the Pamlico Sound. They can salvage the trip for half-day charter boats when the early September northeasters keep the boats from crossing the inlet's outer bar into the ocean.

The deeper water of Old House Channel is a good place to troll a couple of small Clark spoons on long leaders. The Spanish will frequently reveal their presence by leaping out of the water ahead of a moving boat. You'll need to troll for Spanish at a faster speed than you might for bluefish.

Sheepshead are buck-toothed, slab-sided battlers that like to hang around the bridge pilings during the summer. It's not easy fishing, and heavy tackle is necessary to hold these fish that often top the 8-pound mark. Even so, sheepshead have a devoted following of fishermen. Try fishing right next to the pilings with small pieces of hard crabs, fiddler crabs or sand fleas.

Speckled trout and puppy drum make a strong showing at Oregon Inlet in the fall. Their numbers will increase as the heat of August fades into the cool breezes of September and, by the end of that month, the fishing is consistent. The best days are when the wind is blowing hard from the north or northeast and the water is fairly clear.

Fishermen in small boats will want to work the deep holes that run along the edges of the marsh islands—areas like Duck Island, Green Island Slough and Off Island. Lead-head jigs and soft tails such as Mr. Wiffles, Twister tails, or grubs are the local favorites. MirrOlures will produce around Duck Island and the Marsh Islands at the southern end of Wanchese and Roanoke Island, but are not as dependable in deep water.

Trout and drum fishing was excellent in 1993, and the specks averaged between 2 to 4 pounds. Many of the drum topped 8 pounds. That's super fishing on a light spinning rod.

The facilities at the Oregon Inlet Fishing Center are just about the best that I have

seen anywhere for anglers with small boats. There's a restaurant, tackle shop, ship's store, fuel and ice. The boat ramps on the back side of the Fishing Center are first-class. The five concrete ramps are well-maintained by the National Park Service, with finger piers to facilitate launching and retrieving a trailered boat. The parking lot is spacious, and there is no charge for using the ramps or for parking. However, overnight docking is prohibited.

For those who are visiting the area, and want to keep their boat in the water during their stay, facilities are available at the Manteo Town Docks, or at Salty Dawg Marina. You can also find overnight dock facilities in Manteo, just a few miles up the sound north of Oregon Inlet.

Oregon Inlet can be a small-boat fisherman's dream come true, but it may also be a nightmare. There is a lot of shallow water, and it can come upon you in a hurry. Pay attention to the channel markers, and go slowly until you feel comfortable with the area. Don't assume the guy in the boat in front of you knows where he is going, so don't follow him without paying attention.

Locals know these waters, and their boats, like the back of their hand, and some locally built skiffs will run in only inches of water. Some "channel markers" off the beaten path are merely poles with a small reflector or an old milk jug on the top. There may be 2 feet of water on one side, an oyster rock on the other.

Still, you'll find the fishing in these waters worth the effort. For nine months of the year, fish are available in the waters around Oregon Inlet. They may vary in size and numbers, but there is almost always something to be caught. ☐

***The excellent** facilities at the Oregon Inlet Fishing Center give good access for boaters and fishermen to the waters in and around the inlet. Good fishing is only minutes away from the launching ramps, but anglers should keep a sharp eye on the weather because these shoal waters can be dangerous.*

# Do They Really Have 1000 Legs?

Centipedes and millipedes aren't our most sophisticated creatures, but they can get along without stepping on their own feet, thank you.

written and photographed by Harry Ellis ©1994

When I was much younger, I dreamed of traveling to far-off places in search of strange and exotic forms of animal life—to Africa, New Guinea and the jungles of the Amazon. With the passing of time, the lure of those distant lands began to fade somewhat as I discovered more to interest me in my own native woodlands. One path to such adventure has been the study of insects and spiders, along with another group of arthropods, even lower on the scale of life—the centipedes and millipedes. These small explorations can offer to the interested observer a fascination equal to that experienced by scientists in such remote areas as tropical rain forests and coral reefs.

A long history lies behind both centipedes and millipedes. These ancient invertebrates give us a flashback glimpse of life in that geological springtime of our earth so long ago. Century upon century, age upon age, they have survived, coming down to our present day almost unchanged. In western North Carolina, where one is never far from the nearest woodland, innumerable legions of these creatures abound. In fact, the southern Appalachians, with the Great Smokies and the Blue Ridge, are among the world's important global centers of their abundance; only the tropics have more species and individuals. Both centipedes and millipedes occupy dark, moist habitats and are seldom seen by the average forest stroller, who rarely stops to explore the world underfoot. Millipedes, however, are sometimes seen on dark, rainy days, crossing wet logs.

Although centipedes and millipedes bear a superficial resemblance, they belong to two quite distinct, though closely-related, classes of land-dwelling invertebrates—centipedes to the class *Chilopoda* and millipedes to the class *Diplopoda*. Both have long segmented bodies with many legs and paired antennae, yet they differ in several obvious ways. The most evident difference is that centipedes have only one pair of legs on each body segment, while millipedes have two pairs on most of the segments. Moreover, their lifestyles are vastly different. All centipedes are predaceous, and run about very swiftly as they hunt for living prey, while millipedes feed chiefly on decomposing plant tissues and move much more slowly.

***While centipedes** and millipedes appear superficially similar, they actually belong to two distinct classes of invertebrates. Centipedes, like this pair of females guarding an egg cluster (above) are predacious, while millipedes like the yellow banded* Sigmoria *(left) feed mainly on plant matter.*

Of all the numerous forms of animal life that inhabit our woodlands, these strange arthropods are probably the most imperfectly known, even by professional zoologists who have devoted less time to a study of them than almost any other form of animal life. No non-technical texts or identification guides have ever been written. Only a few professionals have given the subject the attention it deserves. One such man is Dr. Rowland M. Shelley, curator of invertebrates at the N.C. State Museum of Natural Sciences, who is one of the world's leading authorities on centipedes and millipedes and their distribution. In our state, he has discovered well over a dozen species of millipedes new to science and the count rises with almost every trip he makes afield.

Centipedes, called "hundred-leggers," are found in tropical and temperate climates throughout the world, with over 2,000 different species having been recorded worldwide and more than 100 from the United States. According to the species, the number

**Narceus Americanus** *is the largest millipede found in North Carolina, growing up to 5 inches in length. Millipedes function as one of Nature's composters, eating decaying plants and returning the organic matter to the soil.*

of legs varies over a broad range, from a minimum of 15 pairs to as many as 173 pairs, with the average probably around 35 pairs. They are rather long-lived creatures, and even the smaller kinds may live six or seven years. The larger tropical forms live much longer, and apparently do not reach their full growth for four years or more.

Centipedes carry on their hunting excursions at night. Their long, flattened bodies are well-adapted to slipping in and out of the narrow crevices that they enter in search of insects, spiders, worms and other small creatures. In the tropics, small frogs and lizards are also included in the diet. The prey is quickly killed by venom from glands that open into a pair of poison fangs on the first body segment, bent forward in such a way as to act with the mouthparts, and from which the venom is injected into the victim. Under provocation, centipedes also bite humans, and if one succeeds in breaking the skin, even a small or medium species can deliver a bite comparable to the sting of a wasp. However, no centipede found in North Carolina is dangerous to man.

Centipedes belonging to the mainly tropical genus *Scolopendra* often grow quite large and are capable of inflicting a very painful, sometimes dangerous, bite. *Scolopendra heros*, from the Southwestern desert region of the United States, grows to a length of 8 inches and has an extremely painful bite. Hospitalizations have occurred, but no fatalities have been recorded. Around the bite of a poisonous centipede, there is intense burning pain, inflammation and swelling, with sometimes dizziness and partial paralysis. Large tropical species of *Scolopendra* may reach almost a foot in length and are considered extremely dangerous. There have been several reports of deaths from their bites, but such reports are often hard to verify.

Fear is the reaction of most people when centipedes are mentioned. But in spite of the numerous horror stories and legends surrounding them, their ferocity has been greatly exaggerated. As most bites are the result of centipedes being accidently trapped against the body, those who are camping where large toxic species are known to exist should carefully inspect, invert, and shake out all clothes and sleeping bags before using them.

During the day centipedes hide under logs, rocks and forest debris and, having photosensitive bodies, are almost never seen in the open during the daylight hours. Because to

most people one centipede is much like any other, none of them have been given common names. In describing them the scientific names must be used, and this is true for the millipedes as well.

In several species of centipedes, the females make underground nurseries for the eggs and young, curl themselves around the eggs and fiercely guard them against all enemies, including male centipedes, that would eat them if they were left unprotected. When the eggs hatch, these females remain several days with the young—which look like tiny colorless adults—watching over them with the same vigilance and maternal care as with the eggs.

Although millipedes are called "thousand-leggers," anyone who actually takes the trouble to count the legs will find that, though well-blessed with them, they do not have anywhere near that number. There are two pairs for most of the body segments, and some species have over a hundred segments, though the average is considerably less. But in spite of their greater number of legs, millipedes move about much more slowly than centipedes. With such a great number of legs, it is a wonder how they can walk at all without stepping on their own feet! The bodies are adapted, not for speed, but for strength in pushing through decaying leaf litter and burrowing into the soil. Despite many tales to the contrary, millipedes are completely harmless to humans, totally incapable of biting.

In size, millipedes vary from ½ inch to over 8 inches. One of our most common forms *Narceus americanus*, reaches a length of over 5 inches, and is our state's largest species. Some millipedes are quite strikingly colored, as, for example, those belonging to the relatively large genus *Sigmoria*, many of its species displaying bright red, orange or yellow colors, with a variety of stripes and patterns. More than 6,500 species are known worldwide, and, with so many new forms constantly being discovered, it is difficult to determine just how many species there actually are. Probably half the world's millipedes are yet unknown to science.

Unlike the predatory centipedes, millipedes are essentially mild-mannered vegetarians that feed on decomposing plant matter, playing an important role in assuring its chemical breakdown or decomposition. In our southern Appalachian forests, the ground is covered with heaps of rotting leaves that appear to be lifeless. Actually, they are living quarters for numberless billions of minute creatures—mites, springtails, harvestmen, earthworms, ants, termites, insect larvae and many species of millipedes. Most of these creatures of the forest floor are vegetarians that chew and grind up the residue that the bacteria and fungi have already partly decomposed, returning it to the soil in a recycled form to be taken up and used all over again. In nature, where nothing is ever wasted, the living is nourished by the dead. Without the aid of these decomposers, which certainly include the millipedes, the woodlands would fill up with debris, the rich, humus-laden soil would not be replenished, and the flourishing forest life would disappear.

***While millipedes** are completely harmless to humans, centipedes can inflict painful bites, though most bites occur accidentally. Like other centipedes,* Scolopochryptops sexspinosus *is an insect hunter. The flattened bodies are well adapted to slipping into small crevices as they search for prey.*

Due to their slow movements, millipedes would be an easy target for predators if it were not for several means of defense that they employ. When in danger, a millipede, as a protective reflex, curls itself up in a tight spiral like a watch-spring, with the head, the numerous legs, and the vunerable body parts in the center of the protective armor casing. In the perpetual blackness of certain deep subterranean caves live species of ghostly white millipedes. They are totally blind but their whole bodies are so mysteriously sensitive to light that at the faintest intrusion of a flashlight beam into their world of darkness, they curl up helplessly in a defensive spiral.

To repel attackers, many species of millipedes are equipped with a formidable system of chemical warfare. If threatened by an enemy, the creature can discharge, from a row of glands along each side of the body, an obnoxious, toxic liquid containing hydrocyanic acid and chlorine. Just by holding one in your hand, it is easy to detect the "bitter almond" smell of hydrocyanic acid. Some of the larger tropical forms are said to be able to spray or jet the secretion for a distance of 2 feet or more. The bright red and yellow colors of certain millipedes probably serve as a warning to potential predators, that learn to associate these colors with unpleasantness and danger.

But, in spite of these defensive adaptations of millipedes, some forest animals, especially shrews, do not hesitate to eat them; in some forests they make up the bulk of a shrew's diet. Millipedes that escape these predators generally have a life span of from two to seven years, depending upon the species. Females lay their eggs in the ground, enclosing them in earthy capsules. The maternal instinct for protecting the eggs and young that is so highly developed in centipedes is almost totally absent in millipedes.

These lesser creatures will probably never attract the interest of the person who can be stirred by no less a natural wonder than a volcano or a Niagara. Yet, an investigation into their strange lives can bring a greater realization of the diversity of living things and a broader view of the enormously complex web of life, of which man himself is a vital part. And man, who alone among all the creatures of the earth has the capacity to inquire, to ponder, and to marvel, must stand in reverent wonder before the secret of life itself. ☐

*Honorary Deeds for Sale*

# Historic Whalehead Club to be Restored as Wildlife Museum

*Written and Edited by Vic Venters*

After decades of neglect, plans are underway to restore the Whalehead Club, one of the grand dames of waterfowl lodges on the East Coast.

In April, the Whalehead Preservation Trust began selling tax-deductible honorary deeds to one square foot of the Whalehead Club in Corolla. All of the proceeds from the deeds, which cost $50 per square foot, will go toward renovating the structure and converting it to the Currituck Wildlife Museum. Full restoration costs are estimated to be about $5 million.

When completed, the Currituck Wildlife Museum will focus on the wildlife and wildlife heritage of the region, in particular the sound's rich waterfowling history. The centerpiece of proposed exhibits will be the priceless decoys of the W. N. Conoley collection. Also to be featured will be antique hunting accoutrements, boats and an environmental-education component.

The Whalehead Club, now listed on the National Register of Historic Places, was originally built in 1925 near the Currituck Lighthouse by Edward Collings Knight, a wealthy northerner whose wife was refused membership in other Currituck duck clubs. When the Knights were spurned, they responded by building the Whalehead Club, a palatial structure featuring carved Art Nouveau motifs, Tiffany light fixtures and cork floors. The building has survived numerous hurricanes, storms and fires that consumed many other old Currituck duck hunting clubs.

The Whalehead Club remained an active hunting club for decades but was eventually sold to developers. In 1992, Currituck County purchased the club for $2.4 million from a development project that had gone into bankruptcy. The county's debt for the purchase price is being retired through the local occupancy tax on coastal hotels and lodging.

The Whalehead Club
Currituck, North Carolina

This certifies that Edward & Amanda Lebel Knight is the Honorary Owner of 25,000 square foot of the historic Whalehead Club in Corolla, North Carolina.

In Witness Whereof, the Whalehead Preservation Trust has caused this Certificate of Ownership to be signed by the duly authorized chairman and its seal to be hereunto affixed this 13 day of April A.D. 19 22

AND 1

At present, the 25,000-square foot Whalehead Club remains structurally sound, said Charles Hartig, the Whalehead restoration project coordinator, although the interior "needs a lot of work." The nonprofit Whalehead Preservation Trust has been appointed by Currituck County to oversee restoration efforts. Funding for the restoration is being sought from public and private sources, and organizers plan for the museum to be open to the public in four years.

The Whalehead Preservation Trust hopes to raise up to $1 million from the deed program. Each donation is tax-deductible. In addition, contributors will receive a deed with an official seal on heavy parchment paper, a handsome walnut plaque and a brief history of the club. "The deed program is designed to give people, regardless of financial standing, an opportunity to be part of the restoration program," said Hartig. "It's a unique opportunity to help preserve part of the region's rich heritage."

The club grounds, including 28 acres of land, contain the clubhouse building, the original club boathouse and a pedestrian footbridge. Adjacent to the site is the Currituck Lighthouse.

The Whalehead Preservation Trust is a 501(c)(3) nonprofit organization and donations are tax deductible. For more information on the Whalehead Club deed program, contact The Whalehead Club, P.O. Box 307, Corolla, N.C. 27927-0307.

KEN TAYLOR

***Restoration efforts are** now underway to renovate and convert the historic Whalehead Club at Corolla into the Currituck Wildlife Museum. Supporters are selling honorary deeds of trust (top photo) to help pay for restoration.*

*Toxic to Some Wildlife*

## EPA Considers Ban on Lead Sinkers

The ubiquitous pack of split shot found in every angler's tackle may soon go the way of gut leaders and metal fishing rods. The U.S. Environmental Protection Agency has proposed a rule that, if adopted, will ban individuals or manufacturers from making, importing or selling all-lead or zinc-containing fishing sinkers that are one inch or under in size or dimension.

According to the EPA, the rule "will reduce the risk of lead exposure to the fishing public and individuals who manufacture lead sinkers." The agency is considering the proposal as part of a "broader federal strategy to reduce exposures to lead." If the proposal is adopted, it will not prevent individuals from using existing lead fishing sinkers.

In 1992, the EPA had received a petition from the Environmental Defense Fund, the Federation of Fly Fishers, the Trumpeter Swan Society and the North American Loon Fund requesting that lead fishing sinkers be labeled as toxic to wildlife. Then, in 1993, the Environmental Defense Fund followed up with a civil lawsuit to require that the EPA address the problems caused by lead sinkers in the environment.

The petitioning groups cited studies that showed common loons, trumpeter swans, mute swans and sandhill cranes dying from ingestion of small lead fishing sinkers. The EPA estimates that over 75 wildlife species—mostly waterbird species—are considered potentially at risk. However, John Melone, the EPA's director of the chemical management division, told *Wildlife in North Carolina* that the agency is unable to estimate how many birds and animals are actually harmed each year by lead or zinc sinker-associated poisoning. The EPA does state: "It is estimated that the proposed ban would prevent over 450 million lead and zinc-containing fishing sinkers that have any dimension 1 inch or less from being produced each year, and potentially from entering the environment."

Lead sinkers and lead jig use has already been banned in Yellowstone National Park, and lead sinker use has been banned at Red Rocks Lakes National Wildlife Refuge in Montana because of fears about toxicity to wildlife.

The proposed regulation affects sinkers 1 inch or less in size are because they may resemble small food items or the grit that waterbirds mistakenly eat. "Once birds ingest a lead or zinc-containing fishing sinker, they can suffer from lead or zinc poisoning," writes the EPA in a publication announcing the proposed regulation. "Their digestive tract often becomes paralyzed; they become weak and emaciated, less mobile; they seek cover or isolation; experience convulsions; go into a coma; and then die within two to three weeks."

The EPA is also "concerned about exposures—via lead fumes or dust when melting or pouring lead—to adults and children when lead sinkers are made at home." If adopted, individuals would be prohibited from making lead sinkers in their home.

Substitutes to lead sinkers are already available, although they are somewhat more expensive. These include sinkers made from tin, steel, antimony, bismuth, tungsten and a terpene resin putty.

At *Wildlife in North Carolina's* presstime, EPA officials estimated that a decision on the proposal may come in mid-spring 1995. If adopted, the prohibitions will be phased in over a period of one to two years after the final rule. For more information on the proposed rule, contact the EPA's TSCA Assistance Information Service at (202) 554-1404.

*Wild Turkey Federation Helps Recovery*

## State's Turkey Population Still Expanding

North Carolina's wild turkey program took great strides in 1994 toward its ultimate goal of restoring the big bird to all suitable habitat in the state. A total of 449 wild turkeys were relocated to 30 different restoration sites across the state.

Of the 449 wild turkeys relocated, 212 birds were trapped instate; 17 birds were trapped in Connecticut; 97 birds were trapped in Pennsylvania; 109 birds trapped in South Carolina; and 14 birds trapped in Virginia. The 237 birds from Connecticut, Pennsylvania, South Carolina and Virginia were acquired through the National Wild Turkey Federation's Super Fund Program. Under this program, states furnishing birds are reimbursed for their trapping costs at the rate of $500 per bird. These funds must be used for the benefit of the wild turkey in that state or for habitat acquisition, research or management.

The National Wild Turkey Federation is paid a $25 per bird administration fee and some shipping costs are involved. The N.C. Wildlife Resources Commission funded $100,000 for the acquisition of wild turkeys through the Super Fund program this year. The other $27,000 was funded by the North Carolina Chapter of the National Wild Turkey Federation.

Since 1970, over 3,000 wild turkeys have been relocated in North Carolina and the statewide population has increased from less than 5,000 to approximately 40,000 birds. The reported harvest has increased from only 144 birds in 1977 to over 2,000 birds each spring for the last two years. The progress with the wild turkey restoration project this year should pay big dividends down the road.

With proper protection, most restoration sites develop huntable populations of the big birds within five to six years and the spring gobbler season can be reopened. Approximately 2,000 birds have been released on restoration areas since 1990. The spring gobbler season is still closed on most of these areas and the harvest is expected to continue its dramatic climb during the next several years as these new areas are opened to hunting.

*—Michael H. Seamster*
*Wild Turkey Project Leader*

## Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Listings for this calendar should be conservation-oriented and should be sent at least four months in advance.

**June 1-30**

American Rivers Month will be celebrated around the nation and state. Check local papers for fishing events, canoe trips, river festivals and education seminars. For more information about activities to celebrate and heighten awareness of our nation's rivers, contact the conservation group American Rivers, 801 Pennsylvania Ave. S.E., Suite 400, Washington, D.C. 20003, or call (202) 547-6900.

**June 26-July 1**

The Twelfth Annual Fur, Fish 'N' Game Rendezvous camp for boys and girls will be held at Millstone 4-H Camp near Ellerbe. Preregistration is required. For more information, contact Leon Harkins at (919) 515-5575.

*Geared for Urban Anglers*

## Wildlife Commission's Community Fishing Program Awarded

The Community Fishing Program begun by the N.C. Wildlife Resources Commission's Division of Boating and Inland Fisheries was honored recently by two national fishing organizations.

During a ceremony on Capitol Hill in Washington D.C., the American League of Anglers and Boaters presented the Wildlife Commission its prestigious Marine Fisheries Award. Last December, the American Fisheries Society recognized North Carolina's Community Fishing Program as the most outstanding sport fishing and management program in the United States.

The objective of the Community Fishing Program is to provide fishing opportunities for urban and suburban residents, especially children, senior citizens and the physically challenged. The program is a cooperative effort where local governments provide 25 percent of the costs and the Commission provides the remaining 75 percent through the Federal Aid in Sport Fish Restoration Fund.

The pilot program began in 1988 in a 12-acre pond at Hester Park with the stocking of 750 to 950 channel catfish several times per year. Catfish are now stocked monthly during the summer months and the program has expanded to Lake Luke Marion in Moore County, Lake Crabtree in Wake County, Reedy Creek and Freedom Park ponds in Charlotte, and Campus Hills Park in Durham.

In addition to the six existing programs, other urban fishing projects to be completed during 1994 are Hornet's Nest in Charlotte, Shelley Lake in Raleigh, Twin Lakes in Durham, Cedarock Park in Alamance County and Bur-Mil Park in Guilford County.

"This program aims to increase fishing opportunities in towns and cities across the state because some people can't get to lakes and ponds out in the country," said Roger Jones, the project leader for the Wildlife Commission's Division of Inland Fisheries. "Greensboro was selected for the initial study and project because the Commission had enjoyed a very good working relationship with officials there on many different projects on the Greensboro city lakes. We hope to have additional waters in the community fishing program all over the state by the year 2000."

The Wildlife Commission not only stocks the catfish each month during the summer, it also builds piers and fish attractors on the program waters, clears areas to make bank fishing accessible, fertilizes the waters and works to control vegetation.

Catfish stocked in the Community Fishing Program waters are 8 inches in length. Jones said the catfish grow at a rapid rate. The daily creel limit is six catfish in ponds in the Community Fishing Program and the minimum length is 12 inches.

Citizens or public officials desiring more information on the Community Fishing Program may contact the Division of Boating and Inland Fisheries, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188, or call (919) 733-3633.

*—Bodie McDowell*

*Nominations Needed for This Year*

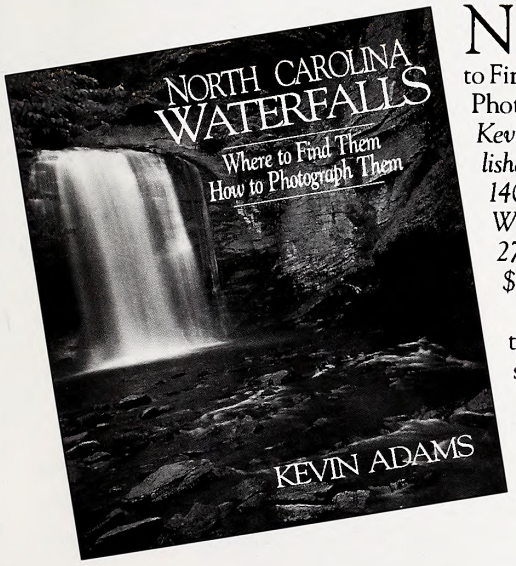
## Small Game Habitat Supporters Awarded

MELISSA McGAW

***Steve Henson (right) accepts the** annual individual Dr. William H. McCall Small Game Award from Dr. McCall at a Wildlife Commission meeting held earlier this year. The Falls of the Neuse Quail Unlimited chapter won the McCall award in the organization category. Henson, a former president of the Southern Appalachian chapter of the Ruffed Grouse Society and chapter habitat chairman for the conservation group, was awarded for his long-standing work to improve ruffed grouse habitat in western North Carolina. Each year the McCall Small Game award is given to an individual, a youth and the organization that does the most to promote small game management in the state. Nominations for the award are made by the public. The deadline for submitting nominations will be August 31. Send names of nominees and their work to the N.C. Wildlife Resources Commission's Division of Wildlife Management, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.*

*Book Review*

## *North Carolina Waterfalls:* How to Photograph Them




North Carolina Waterfalls: Where to Find Them, How to Photograph Them *by Kevin Adams. Published by John F. Blair, 1406 Plaza Drive, Winston-Salem, N.C. 27103, 208 pp. $14.95.*

Outdoor shutterbugs in the southern Appalachians will be hard pressed to find a better book on the subject of waterfall photography than Kevin Adams' *North Carolina Waterfalls*.

Part travel guide and part how-to manual, the book details almost every accessible waterfall in western North Carolina—about 200 of them. The book begins with chapters on equipment and general waterfall photography tips, including pointers on composition, exposure, tripod use, film, filter and lens choice, lighting and seasons. The state's mountain waterfalls are then grouped by general regional location. Each waterfall covered is listed by known names, the height of the fall, U.S. Geological Survey map quadrant, trail directions, trail difficulty, and photo tips specific to individual falls.

The book is illustrated with more than 80 photos, including eight pages of color. In preparing his book, Adams says he drove over 20,000 miles, hiked over 800 miles, shot more than 150 rolls of film and explored more than 300 waterfalls. It shows. *North Carolina Waterfalls* is a high quality production and is a model of what a regional photography guidebook should be.

*Birds, Flies and Flowers*

## Classes On Nature

Classes for naturalists, wildlife photographers, fly tiers and others interested in the Appalachian outdoors will highlight the John C. Campbell Folk School's curriculum this summer and fall.

On June 12-18, ornithological expert James Parnell will be offering a course at the school titled, "An Introduction to the Life of the Birds." Parnell is the co-author of the popular book *Birds of the Carolinas*, as well as numerous other publications.

Classes this summer and fall will include "Appalachian Natural Areas" by George Ellison; "Wildflowers of Western North Carolina" by Tim Ryan; "North Carolina Wildlife and Plant Photography" by Jan and Bill Bolte; and "Fly Tying" by Larry Culpepper.

The school is located in the southwestern North Carolina mountains. For more information, contact J.C. Campbell Folk School, Rt. 1, Box 14-A, Brasstown, N.C. 28902.

*Sgt. Ragland Officer of the Year*

## Wildlife Federation Awards Enforcement Officers

Wildlife Resources Commission enforcement officers were honored this year at the N.C. Wildlife Federation's annual convention held in February in the Research Triangle Park.

Sgt. Chester Ragland of Kings Mountain was honored as Wildlife Enforcement Officer of the Year by the Wildlife Federation. Ragland last year conducted seven hunter-safety education classes, a Commission-sponsored fishing clinic, addressed two civic clubs, assisted four Boy Scouts in their merit badge programs, worked with two small game habitat-improvement projects, conducted a habitat seminar and worked on fund-raising projects for Quail Unlimited and the Cleveland County Law Enforcement Association.

Ragland had earlier been honored as officer of the year for North Carolina by the Southeastern Association of Fish and Game Agencies and by Shikar Safari International, a national conservation sportsman organization.

Enforcement officers also honored for their respective districts were: District 1, Norman L. Watts, Elizabeth City; District 2, John R. Campbell Jr., Walleye; District 3, James F. Frye, Apex; District 4, Todd Radabaugh, Laurinburg; District 5, Michael Faw, Asheboro; District 6, Roger D. Gibby, Mount Pleasant; District 7, Michael A. Hatley, Morganton; District 8, Chester Ragland; and District 9, Darryl W. Burge Jr., Murphy.

—*Bodie McDowell*

BODIE McDOWELL

***Sgt. Chester Ragland** of Kings Mountain accepts the Wildlife Officer of the Year award from C. B. Brown, president of the N.C. Wildlife Federation at the federation's annual awards banquet held in February. Also pictured are (left) John F. Lentz, a federation board member and chairman of the Wildlife Commission; Col. Robert Tatum, (second from right) chief of the Wildlife Commission's Division of Enforcement; and Capt. Garland Hallman (right) of District 8.*

*Safe Boating Week June 5-11*

## New Logo Adds Visibility to Patrol Boats

KEN TAYLOR

***Enforcement officers with the** N.C. Wildlife Resources Commission have a new logo on their patrol boats. The logo was designed to be more visible to boaters. Boat operators and passengers are urged to wear personal flotation devices at all times and avoid alcohol use while afloat. National Safe Boating Week will be observed June 5 to 11. This year's theme will be "Boat Smart, Boat Safe, Boat Sober," and is designed to address the hazards of drinking and boating.*

## Wildlife Endowment Fund Report

**March 1994**

Principal Balance
$19,372,755.16

Interest Earned
$13,564,860.91

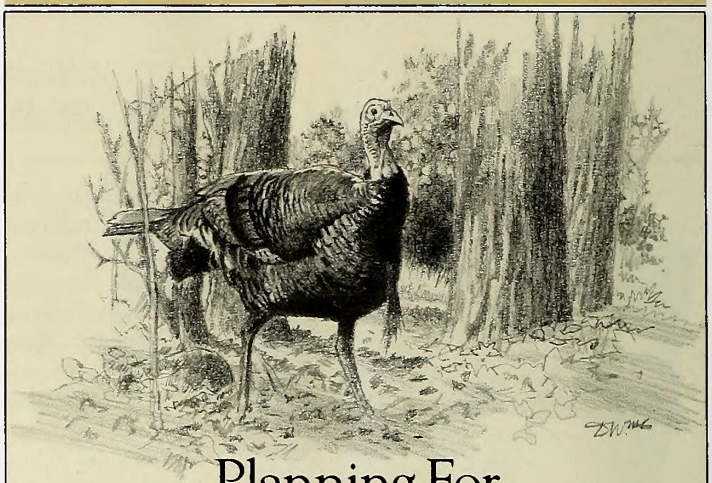
Total Receipts
$32,937,616.07

Interest Used
$5,175,203.48

Fund Balance
$27,762,412.59

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Planning For Forest Beauty and Diversity

*by Vic Venters*

Private landowners contemplating forestry activities in the near future should write the N.C. Cooperative Extension Service for a copy of their new booklet *Forest Stewardship: Planning For Beauty and Diversity.*

The 8-page publication gives sound advice on the various techniques available for planning and managing wildlife habitat, open spaces, forest edges, prescribed burning, and road and trail construction.

One of the booklet's best features is a chart that compares and contrasts the economic and ecological pros and cons of various timber harvest methods—such as single tree selection, group-tree selection, shelterwood cuts, two aged cuts, clearcuts and others.

Depending on the site and method employed, these different timber-harvesting methods can greatly affect the composition of the forest that regenerates after cutting and the type of wildlife habitat that is created or lost. Some of the tips included—such as scalloping the forest edge by leaving irregular tree-lines or isolated clumps of trees—can minimize the appearance of a man-made forest (and provide better wildlife cover).

The booklet stresses the need for landowners to define and set goals for their forest land before active management begins. Helpful tips for creating a resource map—a map listing the natural features on your land—will help landowners set overall goals that are realistic and economically viable.

Many of the management options that are discussed in the book are available to private landowners on a cost-share basis if they enroll in the N.C. Forest Stewardship Program. However, you do not have to be enrolled in the program to use techniques discussed in *Planning for Beauty and Diversity*. For more information or for a free copy of the publication, contact Mark A. Megalos, N.C. Cooperative Extension Service, Box 8003, NCSU, Raleigh, N.C. 27695-8003, or call (919) 515-5636.

# The 1994 North Carolina Duck Stamp Print is Here!

"Buffleheads at Oak Island Lighthouse"
*painting by Phillip Crowe*

Oak Island Lighthouse, the most brilliant lighthouse in North America, is seen in the background of the 1994 North Carolina duck stamp design. Nationally acclaimed wildlife artist Phillip Crowe created this painting of buffleheads. It is the sixth in the North Carolina lighthouse series. To order your print and stamp, contact your art dealer or picture framer. Stamps can also be purchased from wildlife license agents. Revenue from the sale of these stamps and prints will be used for waterfowl conservation and management, including wetland habitat acquisition.

## Uncommon Beauties

The casual observer may not see them often, but at least 60 species of orchids are found in North Carolina. These handsome and delicate wonders are *Galearis spectabilis*, the showy orchis.

Second-class postage paid at
Raleigh, North Carolina

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# WILDLIFE IN NORTH CAROLINA

JULY 1994 $1.50

# Where Are You, Ralph?

*by Jim Dean*

The second thing you notice is that no one is talking anymore. All that pre-dawn joviality at the dock begins to peter out just about the time you pass the sea buoy. A solemn, almost ominous, stillness settles upon the anglers as they become entranced by the foamy wake and the rhythmic roar of the diesels. One would think that this is a particularly reflective group of fishermen, quietly appreciating the raw power of the open sea. It is a bit less than that.

This unlikely moment of dignity is the result of the first thing you noticed as the boat began to pick up the roll of the sea—that there is a funny little acrid taste in the back corner of your mouth somewhere along the base of the tongue, and your throat seems to be ever-so-slightly swollen. Well, you think, the joke I was about to tell will keep. Just getting my sealegs, you know. I'll be fine. Is that really Portugal out there? How fascinating.

ILLUSTRATION BY JACKIE PITTMAN

I know this brand of hearty optimism so very well. You can set your watch by what will happen to me next. Within three minutes, I will have bolted for the lee gunnel and be tossing groceries to the four winds. And isn't it just precious beyond all words how those who are seldom afflicted describe the experience? We are said to be "barfing," "hurling," "calling Ralph," "tossing our cookies," "blowing lunch" and, my favorite, "chumming."

I envy those who never get seasick. My ruling passions are old ships, the wine-dark sea and fishing, and yet I invariably get sick half a mile off the beach. Some able seaman I would make—Jack Aubrey would cut me adrift if I sullied one of his holystoned decks. I have built wooden model sailing ships since I was 10 years old, yet, if I so much as hold a 20-inch brig in front of me and give it a rocking motion, I get cross-eyed.

No problem, you say. Just take a seasick remedy. Try Dramamine, Dramamine II, Marezine, or one of the newer prescription patches you stick behind your ear. Fine, except the only ones that work for me also put me sound asleep. I once took Dramamine an hour or so before we were to go offshore. The Captain called off our trip at the last minute because of heavy seas, so we went to the inlet to fish. I passed out for hours on the hot sand in 95-degree heat. The circling buzzards woke me at dusk.

On a trip just this summer, I thought I had found the answer in some of these newer remedies that are not supposed to put you to sleep. Indeed, we'd gotten almost all the way to the Gulf Stream, and I was feeling wide awake and cocky until I realized that I needed to tie an Albright special before I would be ready to fish for dolphin with flies. By the time I'd finished tying that knot, I knew I would shortly have an opportunity to enjoy my breakfast yet again.

Of course, there are some things most people can do to forestall or lessen the effects of seasickness, although they haven't worked all that well for me. First, by all means take medication in advance. Your pharmacist or doctor can make recommendations, and you'll need a prescription for the patches anyway. Seasick remedies work very well for most people, but I would try to avoid those that warn of drowsiness—why pay $600 for an offshore nap?

There are a few other tips that may help. Stay in the open air, chew gum and watch the horizon if you feel queasy. Don't go below where the stench of toilet chemicals will surely do you in. Also, avoid standing just above the diesel exhausts. There are two schools of thought on eating—some say eat a light breakfast, while others suggest hearty fare on the theory that it, at least, gives you some ammunition. I'm not prepared to make specific recommendations, but perhaps you will recall what the ever-thoughtful Tweetybird offered Sylvester when the latter was in the early throes of *mal de mer*. "Here, Puddy," said Tweety. "You look like you could use a nice piece of greasy pork."

The one seasick event I remember above all others took place out of Morehead City some 30 years ago on an old converted PT boat named the *Danco*. I had worked that summer to save money for a headboat trip and, sick or not, I was determined to fish. Indeed, I was doing fairly well until I mistook my box lunch for some ripe squid (The sandwiches and bait were passed out in identical paper cartons). I barely made it to the rail where I managed to throw up right into the gaping maw of a very nice red snapper that another fisherman had just winched to the surface.

The angler was livid and refused to bring the fish aboard. Instead, he cut his line and stalked off to try his luck at another spot along the rail.

I was too sick to enjoy this at the time, but I recall thinking that he could have rinsed off that snapper. Besides, I would have swapped him a brace of untainted black seabass for it. After all, it isn't often you catch the main course and the stuffing at the same time.

July, 1994
Volume 58, Number 7

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

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## CONTENTS

4 **Shooting Crappies** *by Tim Mead* © 1994
*The dice will always be loaded in your favor if you use this local Lake Wylie tactic for catching crappies. It's so effective, someday everyone will be using it.*

8 **Can We Build a Wetland?** *by Lawrence S. Earley*
*Only nature can build a marsh? While everyone agrees that restoring and creating wetlands is an imperfect science, some say it'll only get better.*

14 **The Art of Patricia Savage** *paintings by Patricia Savage* © 1994
*This award-winning North Carolina artist sees nature in vivid colors, and often from unusual angles.*

20 **Small Lures & Largemouths**
*written and photographed by Soc Clay* © 1994
*If you're having trouble catching largemouth bass, try using small lures on light line.*

24 **Fish That Fly** *written by David S. Lee* © 1994
*illustrated by Duane Raver* © 1994
*Whether they actually fly or simply glide, they can cover astonishing distances over the cobalt sea. How do they do it?*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

**Nature's Ways** *by Lawrence S. Earley*

**Back of the Book** *by Vic Venters*

**Wildlife Through the Year** *by Vic Venters*

**Cover** *Water lilies are common in many eastern wetlands. Photographed by Ken Taylor.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

**Wiregrass is a keystone** *element of the longleaf pine forest. This grass grows in low bunches of mostly dead leaves and burns quite readily. Wiregrass actually encourages fires and is the main fuel by which fire is spread. Frequent fire is essential to the openness of longleaf pine forests and to the survival of dependent wildlife species such as the fox squirrel and the red-cockaded woodpecker.*

**Even after** *it dies, wiregrass remains standing for several years. This provides a ready source of fuel for the light, surface-burning fires that are essential to the survival of the forest.*

**Wiregrass,** *longleaf pine and many other plants in the longleaf pine forest have evolved resistances to fires. Oak trees have less resistance to fire and are reduced when the forest burns.*

**Wiregrass has** *an extensive, fibrous root system that contains food reserves. Within a few weeks of a fire, the plant can produce a fresh growth of green leaves.*

# The Fiery Story of Wiregrass

*written by Lawrence S. Earley/illustrated by David Williams*

In the longleaf pine communities of the Coastal Plain grows a curious gray-green grass that has puzzled biologists for many years. In 1931, no less a naturalist than B. W. Wells called it a "botanical 'believe it or not' that needs investigation."

He was talking about wiregrass (*Aristida stricta*), which derives its common name from the plant's fine, wire-like leaves. Wiregrass grows in dense tussocks throughout the extensive range of the longleaf pine forest. At one time it was the most bountiful grass cover in longleaf pine communities from North Carolina to Mississippi, although like the longleaf itself it's vanishing today.

What perplexed Wells and other biologists was wiregrass's stubborn reluctance to grow back once the soil had been disturbed. Most plants will return to an old field that has been left fallow, but not so wiregrass. Its shallow roots apparently cannot withstand disking operations and other kinds of preparations necessary for farming and intensive forestry. Its ability to regenerate from seed likewise seems very limited.

Curious too is wiregrass's resistance to drought, a condition all too common in many of the habitats where it grows. The plant is shallow-rooted, and though the surface horizon would generally be the first soil layer to dry out in a prolonged drought, wiregrass survives. One reason is that the plant needs very little water. The live leaves consist of mostly woody, fibrous cells, with only a few green cells that need to be kept alive.

This contributes to wiregrass's tinder-like qualities. Indeed it grows to burn. A close look reveals that it's hardly more than a slender matchstick. Hundreds of leaves grow in each wiregrass clump, but most of them are dead and they remain standing for a couple of years. With so many woody cells wiregrass is a lot like "stretched out toothpicks," wrote Wells, "a pile of the finest slivered kindling wood."

Thus when fire occurs, it has a ready source of fuel, passing quickly from tussock to tussock of the flammable wiregrass, fueled as well by the resinous pine needles that litter the forest. Such fires typically weren't conflagrations, but light, surface burns ignited by lightning. Frequent light fires are essential to longleaf pine survival because they kill hardwood tree species that would otherwise grow up and replace the fire-resistant pines. Fires also clear away the needle duff from the ground, prepare the mineral soil seed bed for the pine seeds and control brown spot disease in longleaf pine stands.

Without wiregrass, then, there wouldn't have been enough fuel to carry the life-giving fire, and without frequent fire, the pine forest would have been replaced by a hardwood forest, as has happened all too frequently in recent years. In these cases, many animals such as the red-cockaded woodpecker and the fox squirrel are handicapped when dense stands of hardwoods grow up. Moreover, wiregrass and other plants eventually disappear when fire is excluded.

Thus wiregrass, like other species in fire-dependent ecosystems, encourages fires and is elegantly adapted to survive fires. The central role that wiregrass plays in fueling fire in longleaf pine communities is the reason why some biologists call it a keystone species (see "Nature's Ways," December 1992).

Wiregrass's role as firemaker underscores the complex workings of ecosystems in general, and the longleaf pine ecosystem in particular.

after illustration by Rebecca Pilkington, *Natural Areas Journal*, vol. 9, #4 (1989)

***Wiregrass*** (Aristida stricta) *is a grass that grows in clumps (A). The shallow-rooted plant grows upright (B) and the flowers are arranged on a spike-like panicle that rises above the grass (C). Each flower, or spikelet, has three bristles, called awns (D).*

TIM MEAD

# *Shooting* Crappies

The dice will always be loaded in your favor if you use this local Lake Wylie tactic for catching crappies. It's so effective, someday everyone will be using it.

by Tim Mead ©1994

"Bill," I asked my good fishing buddy, "How'd you like to go out to Lake Wylie and catch some crappies? I guarantee success."

Bill Shumaker, professor of philosophy at the University of North Carolina at Charlotte, has heard my guarantees before so he was appropriately skeptical. But, like anglers the world over, he is also hopeful. Usually hope overcomes skepticism. "Sure," he answered. "I'm always ready to test your theories."

"Good, I should mention that we'll be shooting these crappies," I said.

A couple of days later we met at the N.C. Wildlife Resources Commission landing at South Point just south of Belmont on the main channel of Lake Wylie.

Shooting crappies is very common at Lake Wylie and rarely seen elsewhere, but it doesn't involve a firearm. Instead, it's a technique that permits the fisherman to use a short rod to "shoot" jigs up under piers and docks. From personal experience, I know that it works anywhere that there are boat docks and piers, and it is an easy technique to use.

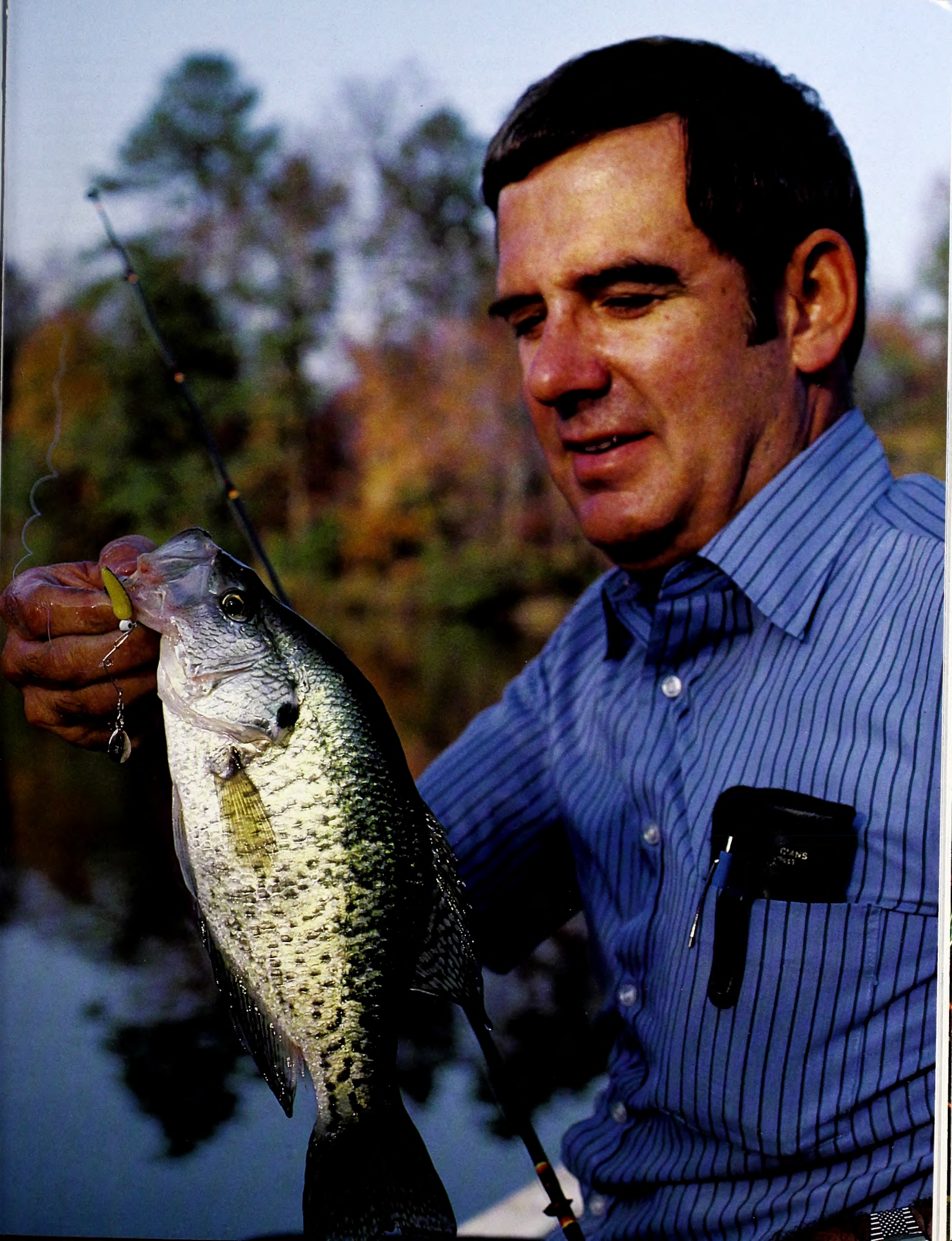
Virtually all Tar Heel crappie anglers know that once the spawning period is over, crappies often congregate around wooden boat docks and piers. Many of the docks and piers have brush piles at strategic locations, and these spots hold crappies. Virtually everybody fishes for crappies adjacent to the pier pilings and brush piles. Year-round, the most productive spots have crappie seekers nearby casting jigs or dunking minnows, and they catch some fish.

What they often miss, however, are the crappies that are under the piers and boat docks. Jigs or minnows fished around the edges simply do not draw out those fish that are holding far back under the cover. Shooting, however, presents a jig directly to those fish. Live minnows would work great, but you can't really use these effectively because they can't withstand being whacked against pilings or boat docks.

Special, though inexpensive, equipment is needed to maximize success, and short fiberglass rods about 2-feet long are used, and those used in ice fishing are most commonly employed. Such rods are more versatile for casting in cramped quarters, and the soft action of fiberglass is more forgiving of casting errors than stiff graphite—the jig seems to drift with a glass rod while a graphite rod seems to hurtle the jig out of control. To complete the outfit, the rod is matched with a small, push-button reel and light 2- or 4-pound test monofilament line.

The whole idea of shooting is to cast a jig through a small opening—for example, a gap in the supports or under the door—in the

***Bill Shumaker** (above) lands a crappie that he caught under this Lake Wylie boathouse using the short-rod tactic known as "shooting." Many nice crappies like the one Jack Avent (right) caught on this small Beetlespin spend so much of their time far under docks and boathouses that they seldom see a lure.*



# Shooting Crappies

dock or pier. With the rod tip pointing straight up, let the jig hang down about to the level of the reel. Push the reel button with your thumb, then pinch the jig between a thumb and forefinger and pull it toward you, bending the rod into a bow.

Depending on the opening you are trying to cast into, hold the rod parallel to the water or vertical with the tip down. Casting parallel to the water works for places like the gap between a boat dock door and the water or the holes between dock float cubes. A vertical presentation will work better for an upright gap—for example, the opening between two close piers, a pier and a boat, or other comparable spot.

To make the cast, release the jig and the button at the same time. Once you get the hang of it, the jig will shoot as far as 15 or 20 feet under the overhanging cover. Then, you fish the jig as you would for crappie with a standard ultralight outfit.

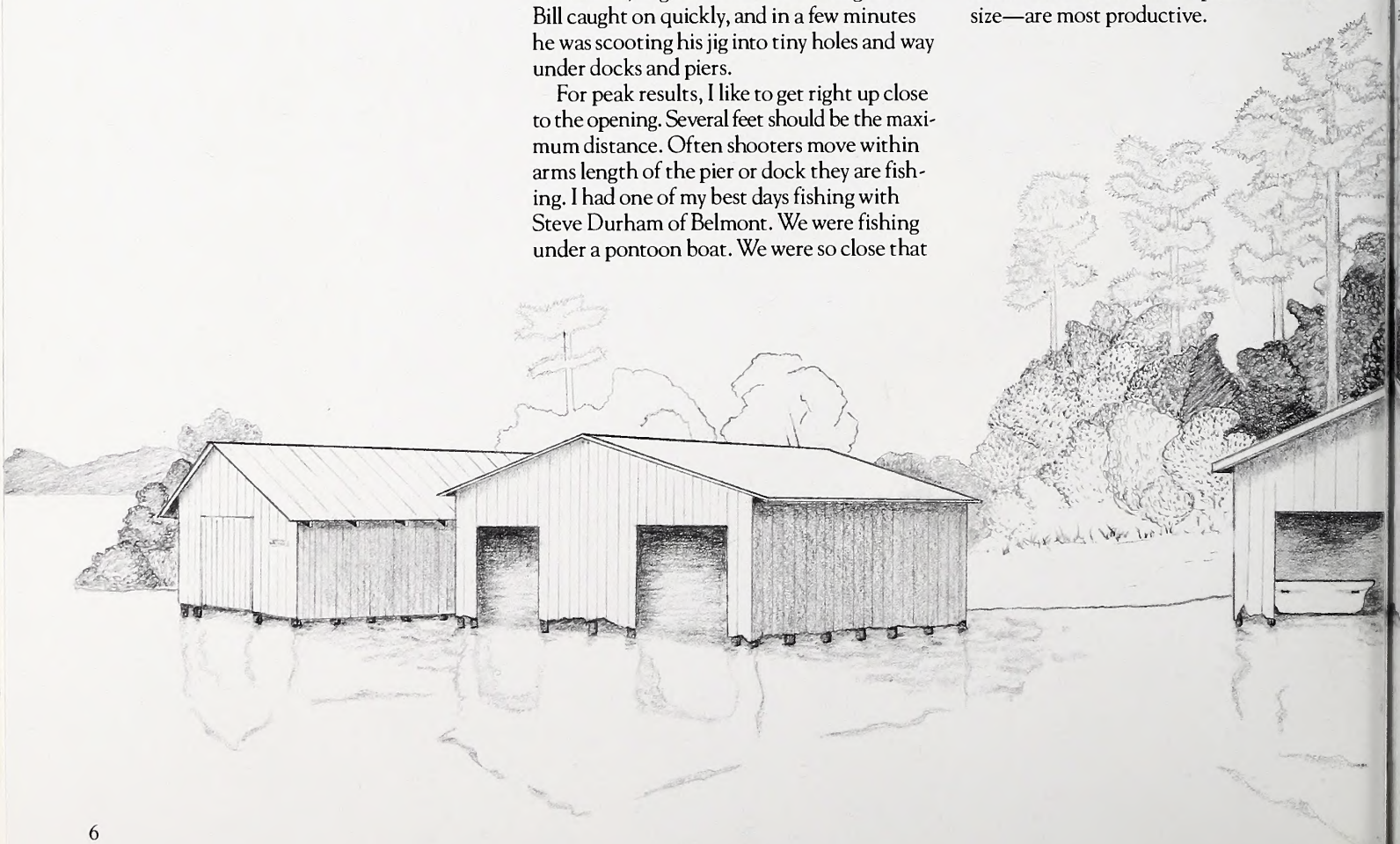
"I need to hang on to the end of the grub, not the head," Bill muttered to himself after the third cast. That's excellent advice. If you grasp the jig head, you may drive the hook into a finger or thumb when you release the jig.

After a bit of practice, shooting becomes as easy as a standard cast. Practice, of course, counts in shooting as it does in other techniques. When I have not been shooting for some time, it takes a few whacks on the side of a dock and a few whangs on the metal of a boathouse, to get back into the swing of it. Bill caught on quickly, and in a few minutes he was scooting his jig into tiny holes and way under docks and piers.

For peak results, I like to get right up close to the opening. Several feet should be the maximum distance. Often shooters move within arms length of the pier or dock they are fishing. I had one of my best days fishing with Steve Durham of Belmont. We were fishing under a pontoon boat. We were so close that we maneuvered our boat around by hand to maintain access to the opening on either side of the pontoon boat's engine. We each had a hole to shoot through and we were close enough to assure accuracy with our jig. We caught a lot of nice crappies.

When shooting, as with any other outdoor activity, you need to respect the property of others. Most pier and dock owners understand anglers and are cooperative. In turn, anglers fishing near or under piers and docks need to show courtesy to owners and appreciate their property. Don't leave snagged jigs or tangled lines on docks or piers. Chances are good that someone's grandchild will be walking barefoot on that pier. If the owners are sitting on the pier, don't disturb their privacy. Even if it's the best crappie hole on the lake, I'll move to another spot if a property owner asks that I not fish in the vicinity of a pier or dock. There are plenty of other crappie spots on every lake, and access to any single place is not worth a shouting match or worse.

Small jigs work best. In the spirit of experimentation, I have tried shooting jigs up to ¼-ounce, but the big jigs do not work well. They overpower the rods, reels and lines. Also, crappies under docks and piers are often suspended near the surface rather than near the bottom, so a lighter jig does not drop past the fish as rapidly as a heavier one. I've found that 1/16th-ounce lures—plus or minus a size—are most productive.



Every crappie fisherman seems to have a favorite choice of grub tail, and these choices vary. Maribou tails are excellent crappie catchers, but you lose lots of jigs fishing under piers and docks, and jigs with maribou tails tend to be more expensive than a combination of lead head and soft plastic grub. Curly tail, paddle tail, straight tail, and tube grubs are all favorites among different shooters. Advocates of each type have explained why their choice was the only one that could catch crappie. Curly and paddle tail grubs sink a little slower than straight and tube tails, so if crappies are aggressive or in deep water under the cover, perhaps the more rapidly sinking grubs are the best bet. It's a good idea to carry a variety.

And what is the best color? There are fishermen who insist that chartreuse, green, yellow, black, white, red or some combination is always the best. If you have an "always best" color, use it. If not, I suspect you may find that any of the standard crappie color tails will work.

When is the best time to shoot for crappies? Any time. Crappies are predators. As with predators throughout the animal kingdom, predators are at an advantage when not seen by prey. Among fish predators, a principal means of being unseen is to lurk in shadows, so crappies hide under piers and docks because they can rest in the darkened area and look out into the light. These places also attract the foods they eat. If forage is plentiful—as it usually is in late spring and summer—the crappies may not need to come out for days at a time. Yet anglers who fish the outside edges of piers never present a lure to these fish.

Post-spawn crappies are particularly likely to be hiding under piers and docks. Overhead cover provides constant shade. Consequently, the water under the docks and piers is likely to be several degrees cooler than that in the direct sunlight. Those few degrees may be sufficient to draw large crowds of crappies.

Most North Carolina crappie anglers face competition not only from other fishermen. Many folks use waters in our state. For those of us who work during the week, there are many other people also enjoying the water by the time we get to our favorite reservoir. Intense traffic on the lake drives crappies and other game fish ever tighter to cover. As a result, even during the peak-use periods of summer, crappie fishermen who use the shooting technique can still catch fish.

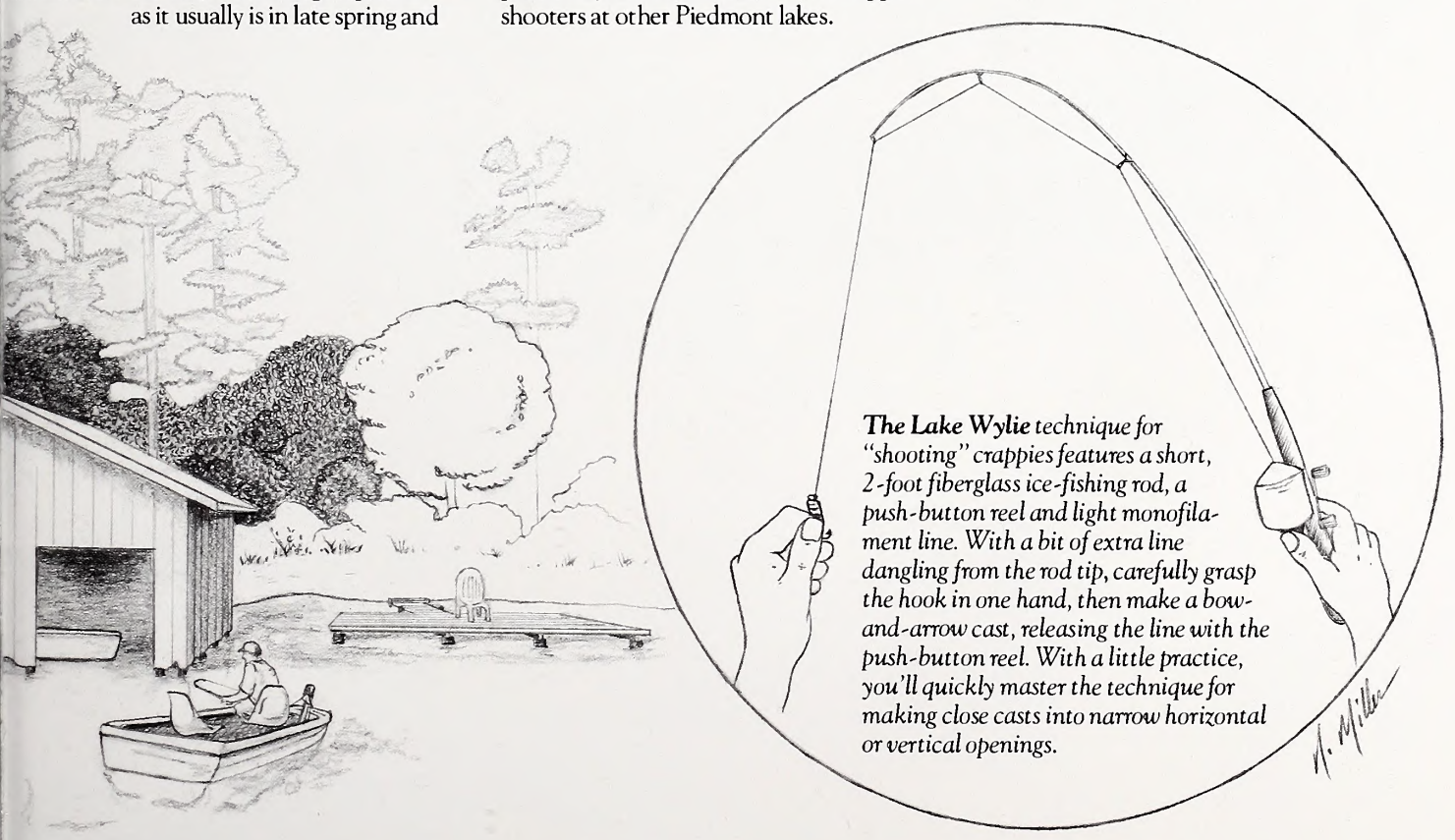
Which piers and docks are best for shooting? Those easiest to fish may be less productive than those where access is more difficult. The smaller the opening, the less likely others have tried successfully to catch crappies hiding there. Also, where the water is close to the pier deck or pilings are densely packed, the greater the prospect that lots of crappies will be there.

For years, since I was first introduced to shooting by Steve Durham, I have been puzzled by the relative absence of crappie shooters at other Piedmont lakes. At Lake Wylie, virtually everytime I fish I see several boats pulled up close to piers or docks. Bait shops near Lake Wylie stock the short rods required by shooters, but only a few miles away, shooters and their gear are rare. A couple of years ago, I noticed some chaps shooting for crappie at Lake Norman only 30 miles or so from Wylie. When I told them how rarely I saw shooters at Norman, one of them had an explanation. "I fish Wylie most of the time," he said. "I'm just up here for the day."

If you are not shooting for crappies, you are missing a bet. There are crappies under piers and docks all across the state, and chances are you never fish for them. Your motto should be, "They're under there, and they won't come out." The solution is to go under there after them.

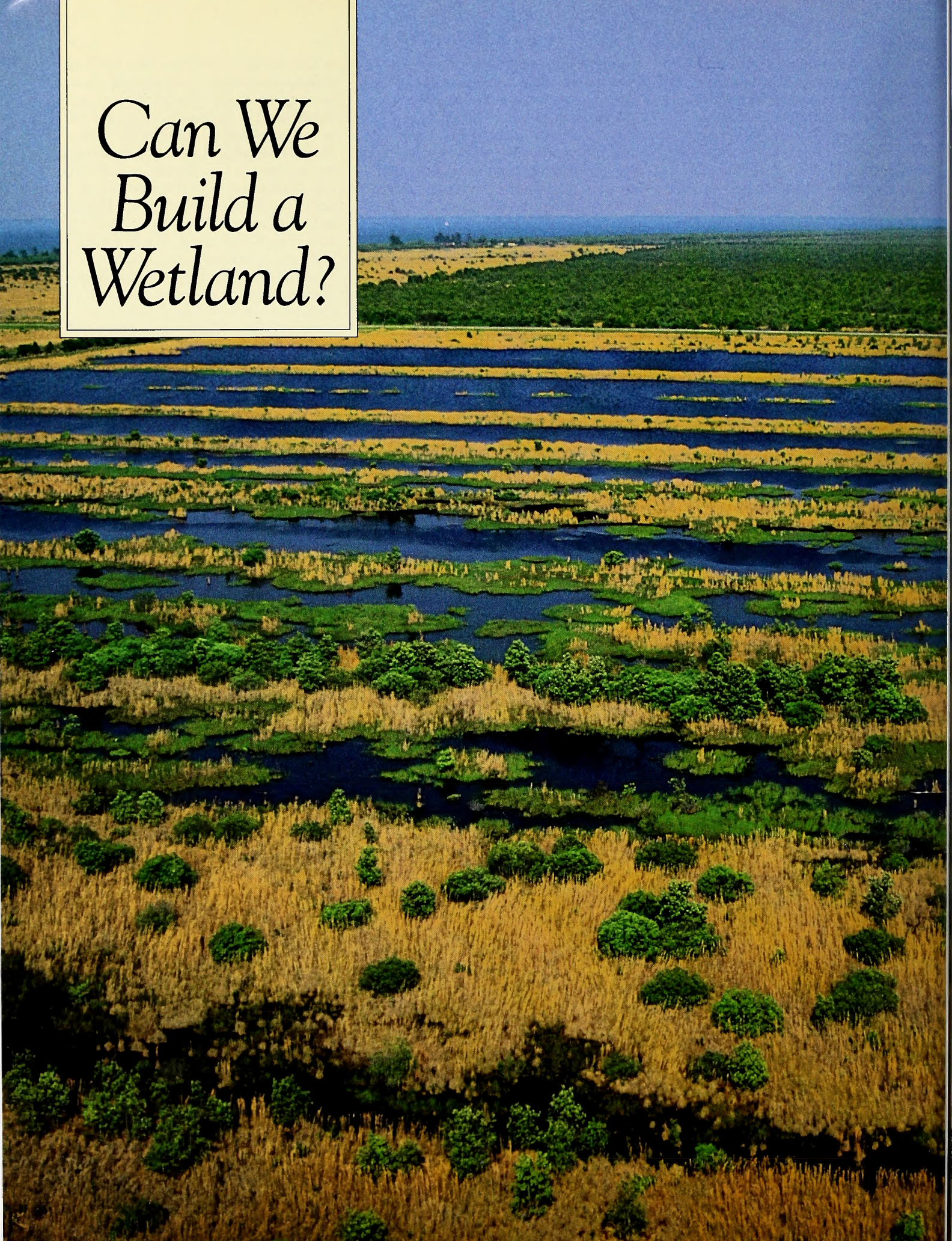
Bill Shumaker had a good time shooting for crappie the day we fished together even if we didn't use a gun. We caught some fish, enjoyed our time on the water, and he promised me that he was going to master the technique.

"That's a lot of fun," he said. "I had heard of it, but never tried it. Next time you guarantee something, I will take it a little more seriously." ☐



***The Lake Wylie** technique for "shooting" crappies features a short, 2-foot fiberglass ice-fishing rod, a push-button reel and light monofilament line. With a bit of extra line dangling from the rod tip, carefully grasp the hook in one hand, then make a bow-and-arrow cast, releasing the line with the push-button reel. With a little practice, you'll quickly master the technique for making close casts into narrow horizontal or vertical openings.*

# Can We Build a Wetland?



# Only nature can build a marsh? While everyone agrees that restoring and creating wetlands is an imperfect science, some say it'll only get better.

by Lawrence S. Earley

A well-constructed dirt road divides a solid wall of pocosin wetlands from a cleared field. Incinerated by a devastating fire in 1985 that consumed over 100,000 acres here and elsewhere in Tyrrell County, the pocosin apparently has recovered, revealing the amazing resilience of this fire-adapted ecosystem. Some of the pond pines are already 25 feet tall and a dense palisade of bay trees and other evergreen vegetation has shot up as well. The field on the other side of the road was ditched and drained and its vegetation eliminated some years back when the land belonged to First Colony Farms. The pocosin vegetation has yet to return to it, although Jim Savery is hoping for the best.

"This is where we blocked the canal along the road," he says. Savery is the manager of the 112,000-acre Pocosin Lakes National Wildlife Refuge, which was formed from former First Colony lands in August 1990. "It's restored quite a bit of water onto the fields. I'm anxious to see what kind of vegetation changes we'll see this summer."

Savery is showing me how the refuge staff is trying to reverse the process by which pocosin wetlands were turned into dry land. To lower the water table in this 3,500-acre tract, the "superfarm" dug V-ditches 330 feet apart to carry water into the canal that ran alongside the road. The land was cleared and in some areas giant tractors scraped away several feet of peat so that the mineral soil below could be farmed.

Now Savery and his crew are trying to restore the former pocosins, blocking the ditches and installing new water-control structures to raise the water table so that the wetland can resume its natural functions on the landscape. "These fields are wet well into August now," he says proudly.

Restoring—even creating—wetlands is a hot topic in North Carolina today, reflecting a national phenomenon. In a state which by one estimate has lost more than half its wetlands since European settlement, the possibility of putting wetlands back on the landscape is intriguing. If we could learn to do that, we'd be able to add valuable new habitat for waterfowl and other wildlife. We could engineer new wetlands so they'd store groundwater, clean our water, hold back flood waters and do all the other services long performed by natural wetlands, before so many vanished. For too long, we studied how to make wetlands dry; we mesmerized ourselves with the mechanical power of backhoes and draglines. "We cultivated the soil but wiped out varied and intricately interwoven webs of life," writes John Berger in his influential book, *Restoring the Earth*. "By contrast, restoration is an effort to imitate nature in all its artistry and complexity by taking a degraded system and making it more diverse and productive."

That's the lure of the burgeoning wetlands-restoration movement nationwide. But how reliable is this science? Is it a science at all, or merely a hoax as some maintain? Worse, is it legitimizing the continued destruction of natural wetlands in the vain hope that we can replace them?

Jim Savery is an optimist on the subject, but he'd be the first to admit that restoring the wetlands at Pocosin Lakes will not be easy. We drive to one of six new flashboard risers costing about $10,000 apiece that have been installed. These structures are the keys to this restoration project because they help maintain the amount of water found on the site. Understanding the hydrology—how deep the water lies, how it changes from season to season, in what direction it flows—is critical to the success of all wetlands-restoration projects. If the water is too deep or too shallow, or if it's not there for the plants at the right time, the wetland will fail.

"We've got a very complex water-control job here because there are adjoining fields that belong to private landowners," says Savery. "We have to keep water off their land, but on ours. So we have to know a lot."

Fortunately, Pocosin Lakes has had a lot of help. Early on, the refuge contracted with the U.S. Soil Conservation Service to create a plan to design water controls over the entire refuge. The first draft of the plan was completed early this year. In some areas of the refuge, the plan called for nothing more ambitious than getting the water back on the land and seeing what plants grew.

On a 15,000-acre block south of Lake Phelps, the U.S. Fish and Wildlife Service is taking a more active hand. Refuge staff will be working on a massive research project involving water controls and special plantings. The square-mile plot has been pretty roughly used over the past 40 years—first farmed, then peat mined and even grazed. The staff is planting extensive stands of Atlantic white cedar and pond cypress trees. A grant from the U.S. Environmental Protection Agency will finance the planting and Weyerhaeuser Corporation has donated 12 acres of Atlantic white cedar for research. Horticulturist Eric Hinesley from N.C. State University will conduct research on the giant plot.

"What will the cedar and the cypress do in five, 10 or 30 years?" Savery asks. "That's what this study will help us determine. We want to restore the pocosins, but all we can do is manage the water levels as best we can. We don't know how successful we'll be, but it'll be better than it was."

***The large-scale*** wetlands-restoration effort underway at Pocosin Lakes is scarcely typical. For one thing, most restoration projects involve no more than a few acres, and there have been very few attempts to restore pocosins. Moreover, most projects aren't done out of an altruistic urge to offset wetlands losses, but because laws require them. According to Section 404 of the Clean

MELISSA McGAW

***At Pocosin Lakes*** *National Wildlife Refuge, ditches have been blocked and the water table raised (left) to restore the pocosin wetlands that were cleared and drained during the 1970s and 1980s. Refuge manager Jim Savery (above) stands next to an Atlantic white cedar seedling, one of several experimental plantings the refuge staff has begun.*

LAWRENCE S. EARLEY

JEFF FURNESS

***Above, Jeff Furness** of Texasgulf (at left) and consultant Bruce Bolick (at right) survey the freshwater marsh that the corporation created from a former pine plantation. Creating wetlands where none existed before is expensive and difficult to achieve, requiring large earthmoving equipment (left).*

Water Act, if your road, marina, housing development or shopping mall will destroy a wetland, and you can't move the project, you may have to restore, enhance, preserve or create an equal or greater number of wetland acres as compensation. This is known as wetlands mitigation, and it's the arena in which most wetlands restoration and creation projects take place in North Carolina. It's also a controversial practice.

A strict sequence of requirements must be followed when applicants apply for permits to fill wetlands. Before a permit is granted, "Applicants have to show that they have tried to avoid impacts in wetlands altogether," says biologist Dennis Stewart, formerly with the N.C. Wildlife Resources Commission and now with the U.S. Fish and Wildlife Service. "When they can't avoid them, they must show that they've minimized them. And then in step three, they compensate for—or mitigate—the impacts that are unavoidable." In that case, applicants would be required to replace the natural wetland acres affected by their projects with an equal or greater number. Of course, all of these steps depend on whether they are "practicable"—if any of these steps costs too much or are logistically or technologically impractical, then the applicant doesn't have to do it.

Mitigation is a compromise, say its supporters—developments in wetlands are allowed to move ahead when they are in the public interest, but other wetlands must be restored, enhanced, preserved or created in compensation. Regulators prefer that applicants mitigate on site rather than off site, and they like to see "in-kind" restoration—if you fill freshwater marsh, for example, you should restore or create freshwater marsh, rather than some other kind of wetland. There is also a preferred mitigation hierarchy, with restoration ranked at the top of the list and creation at the bottom.

"With restoration you're talking about a situation where a wetland existed at one time but because the vegetation has been removed and the hydrology is altered, it may not be a wetland any longer," says Stewart. "If I add the vegetation and bring the hydrology back, I have a good chance of having a wetland again."

Creating a wetland where one never existed before is much more difficult, however, and the chances of failure are far greater.

One company that has pioneered in creating wetlands in North Carolina is the giant fertilizer company, Texasgulf, Inc. of Aurora. Since 1979, the company has created and restored 265 acres of wetlands—brackish marsh, freshwater marsh, bottomland hardwood forests and wet hardwood forests—on its 80,000-acre property. Its scientists are proud of its state-of-the-art techniques for creating and restoring wetlands.

On a warm February day, I accompany Jeff Furness, an environmental scientist with Texasgulf, to see some of the company's projects. With us is Bruce Bolick, a consultant with CZR, Inc., who is monitoring the success of several of the wetlands. Texasgulf makes its fertilizers by mining phosphate from ore found from 90 to 140 feet deep. We watch as distant draglines cut deeply into the soil to extract the ore. Left behind is a vast, denuded moonscape of rock and soil in huge piles. Pits of phosphorous-rich water scummed with emerald-green algae give the scene a surreal look.

At Porter Creek, Furness shows me a freshwater marsh fringed by young bald cypress trees. "We started this created wetland site in 1990," says Furness, "so it's still young." Bolick points out a few gadwalls and a shoveler swimming in the marsh; some cormorants are sunning themselves in a tree. A bald eagle has been nesting in the forest behind the marsh. Bolick has found eight species of fish in the marsh, seven species of reptiles and amphibians, 103 species of birds and 12 mammal species, including black bear. The project won an award from the N.C. Division of Land Resources as "Best Reclamation at a Large Mine in North Carolina in 1993."

At a site on South Creek, Texasgulf has created a brackish-water marsh, with the aid of N.C. State University professors Ernest Seneca and Steve Broome. Four different kinds of marsh grasses blow in the steady breeze. It's a place for ducks, a place for fish. Who could have guessed that 10 years ago it was a pine plantation.

"We excavated about 8 feet down so that the site would connect hydrologically to South Creek," says Furness. "We created a channel in the center and sloped the banks gently to form the marsh. After 10 years of monitoring, we've found that these created marshes are functioning as primary nursery areas for young spot, croaker, blue crabs and brown and pink shrimp."

Texasgulf's man-made wetlands look good, but are they as good as the natural ones? Do

they function like natural wetlands? Questions like these continue to dog restoration and creation projects everywhere, and they are at the heart of the current controversy over the company's 20-year mine-expansion plan. Texasgulf has prepared several alternative plans as part of the environmental impact statement accompanying its permit application to fill wetlands. Its preferred alternative would extend mining operations into an additional 4,516 acres, of which nearly 3,100 acres are wetlands. The company would have a large mitigation obligation, which is one reason why it has been experimenting in wetlands restoration and creation techniques. It hopes that its restoration and creation sites will qualify as mitigation for the extensive impacts.

It's difficult to know how well the company's wetlands are functioning. For sure, certain functions will be lacking, those that take a long time to develop. Natural wetlands have evolved in particular locations over thousands of years because of conditions—soils, hydrology, topography—that are difficult to replicate immediately. "In the case of older natural marshes, there is a tremendous organic build-up or carbon bank," says Ernest Seneca, who has pioneered in constructing and restoring wetlands in North Carolina. "It takes a long period of time for this to develop. There may be invertebrate organisms that depend on this carbon bank, and if you don't have the carbon bank you don't reestablish the invertebrates as quickly." Yet Seneca still believes that restored and created wetlands can compare favorably to natural ones. "I don't question that they are functioning in the same way," he says, "but there may be a difference in magnitude in the services performed."

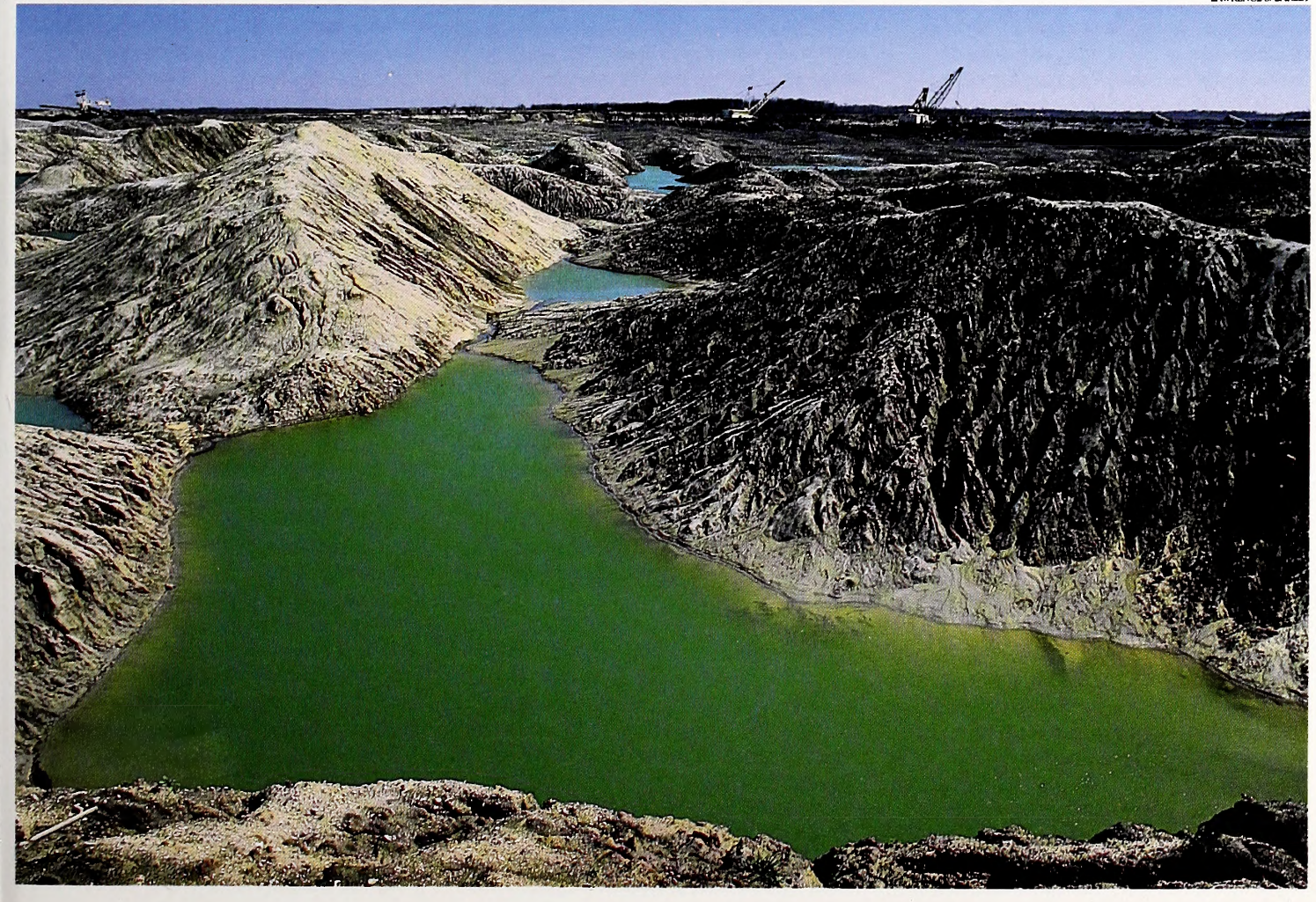
Similarly, natural bottomland hardwood forests, another wetland type, contain many older trees with cavities that are sought by nesting birds. Yet though it may take 80 to 100 years for similar cavities to form in created wetlands, other functions and services could develop more quickly. "You could get flood storage pretty quickly and sediment trapping," says David Lekson, field office manager with the Washington office of the U.S. Army Corps of Engineers. He admits that regulators like himself can only judge new or restored wetlands by considering only a few of the services they are supposed to perform. "When you're in the regulatory business like we are, the functions that we can deal with over the short term are whether the wetlands are good for wildlife or store floodwaters, things like that. We assume that other functions such as nutrient uptake, detrital export and the like will take place down the road."

***Many critics*** believe that that's precisely what's wrong with wetlands mitigation in general—it allows natural wetlands that have formed over hundreds of years to be destroyed in exchange for damaged or man-made wetlands whose functioning or longevity is in question. Despite good-faith efforts, mitigated wetlands often fail.

A good example of this occurred in Durham in 1990 when mining company Nello L. Teer attempted to create 29 acres of wetlands to mitigate the filling of 15.6 acres of

***Fertilizer manufacturer*** *Texasgulf employs giant draglines (in the distance) to dig sometimes 140 feet deep to take phosphate from ores. This kind of mining leaves moonscapes of open pits filled with algae-covered water. Texasgulf has reclaimed some of these mining pits into wetlands. Such wetlands may take many years to equal the functioning of natural wetlands.*

LAWRENCE S. EARLEY



MELISSA McGAW

***Rules restrict** but do not forbid development in wetlands. Developers are required to replace natural wetlands with functional equivalents, whether restored or created. N.C. State University professors Russ Lea (left) and Doug Frederick (right) specialize in wetlands restoration and creation.*

bottomland hardwoods above the headwaters of Buffalo Creek in Durham and Orange counties. The mitigated site was on high ground adjacent to a beaver pond. Company officials and regulatory officials proposed to make the upland wet by digging a series of canals into the upland forest from several water sources, including the pond. The intent was to produce hydric soils, which together with wetland plants and wetland hydrology, comprise the trinity of wetland indicators regulators look for. Despite some doubts, all parties concurred in the plan.

To date, however, the site has not produced hydric soils. "If we wanted to, we could have dug a lot more ditches and flooded the forest, but we would have killed the trees," says Steve Edgerton, environmental engineer with Nello Teer.

No one blames the failure on anything but bad luck. The company made a good-faith effort to comply with its permit requirements, the reviewing agencies ok'd the job, but the site still fails to qualify as a wetland.

Nello Teer's site is no exception. In study after study, surveys of mitigated wetlands have revealed a startling rate of failure. A study of 32 mitigated wetlands in Virginia in 1985 showed that less than half the created wetlands were successfully established. Florida's assessment of the effectiveness of its required mitigation projects beginning in 1990 showed that many of them had not been done, and that less than half of those that were completed were ecologically successful. On the basis of this study, the Florida Department of Environmental Regulation decided to "refocus its permitting practices toward avoiding wetlands and minimizing the effects of permitted activities on wetlands." A 1990 Duke University study of 10 wetland mitigation sites in North Carolina found that only one project was successful.

Experts cite a variety of reasons for the high rate of failure among mitigated wetlands. Heading the list, of course, is the primitive state of the science of wetlands restoration and creation, but many also blame a lack of project monitoring. Too often permit applicants deliberately neglect to do the mitigation work they have agreed to. The Corps of Engineers, which is responsible for ensuring that the projects comply with permit requirements, is chronically short-handed. "We just don't have the manpower to do it, plus keep up with our other work," said Wayne Wright, chief of regulatory services at the Corps' offices in Wilmington. "And it's going to be a bigger problem in the future as we see more restoration and creation projects."

"Fly-by-night" consultants are another reason for poor success in mitigated wetlands. Most permit applicants just want to get their permits to develop in wetlands, and they have their mitigation work done by the cheapest consultants they can find. The result is poor work. "You can do it right," says Curtis Richardson of Duke University, "but it's much easier to do it wrong. People think that creating a little hole in the ground is creating a functioning wetland."

A lack of long-term commitment is another reason for failure. Few permit applicants have the desire to ensure that a restored or created wetland will be functioning over the next 10 years, much less 20 or 50 years. Generally, the Wilmington District Corps of Engineers only requires applicants to maintain wetlands for three to five years.

These problems are why Ron Ferrell believes that mitigation is too important to be left to the permit applicant. Ferrell is an environmental specialist with the Water Quality Section of the N.C. Division of Environmental Management. "You can't restore wetlands the way we need them restored through the regulatory process," he maintains. "Right now each individual applicant is required to do his own mitigation, and it's just not working. In fact, it's a disaster."

The biggest problem he finds is that the system almost ensures shoddy performance. "Here you have a guy who is interested in building a shopping center, and you tell him to go and build a wetland. Well, he could care less about a wetland; he feels it's punishment." Ferrell believes that restoring or creating wetlands is a matter of managing natural resources, an area that may be better left to professionals. He envisions a process by which the permit applicant could write a check and the state or federal government would build or restore the wetland.

"We need a more comprehensive effort," Ferrell says. "Right now we're going out and placing a wetland where it's convenient for the applicant to put it, without any regard to how it functions within the system, within the watershed, or within the bigger picture. Until we use mitigation credits to put wetlands where they are needed on an ecological basis, then we're not doing the job we should be doing."

Ferrell's concern about the big picture is shared by Doug Rader, senior scientist with the N.C. Environmental Defense Fund. He also criticizes the process by which tiny fragments of mitigated wetlands are scattered over the landscape without any forethought. He proposes long-term planning that would guide the restoration or creation of wetlands so they would do the most good.

"The exciting idea is to transform this ad-hoc mitigation process into a goal-directed one," Rader argues. "It would allow you to deal not just with wetland issues, but with other issues such as nonpoint source pollution, habitat issues and wildlife corridors."

***In a little field*** in Tyrrell County, just outside of Columbia, integrating wetlands into the landscape is more than just a pipe dream. This field used to be a forested wetland before it was cleared, ditched and drained to grow corn and soybeans. Now the pump that drained the field sits idly beside the road. Making their way into the middle of a mostly broomsedge-covered field, Doug Frederick and Russ Lea point to meandering corridors of 5-foot tall bald cypress and tupelo gum trees they planted two years ago.

"Eventually it'll be a cypress-gum swamp," says Frederick. "In the low part here, it'll probably be heavily dominated by cypress."

Frederick and Lea, both professors at the School of Forestry at N.C. State University, have formed a company, Triangle Wetland Consultants, that specializes primarily in restoring wetlands, although they are also involved in a large-scale wetlands creation project elsewhere. The two are restoring this 25-acre site as mitigation for a project in Kitty Hawk that affected about 10 acres of wetlands. They turned the pump off, broke through the berm separating the field from a gum swamp, and flooded a couple of ditches to restore the water table. Then they planted the field in cypress and gum trees in the wet spots, sweet gums and oaks in the upland portions.

"In five years we'll be able to demonstrate that we've got the hydrology and the plants to make a jurisdictional wetland," says Lea. "We're shooting for 80 percent survival of the 700 trees per acre we planted." Frederick points out that to be successful, their project

DOUG FREDERICK

***In a Tyrrell County** field that formerly grew soybeans and corn, the water table has been raised to restore a bottomland hardwood wetland forest. Russ Lea surveys young plantings of bald cypress and black gum trees in the wet sites, and oaks on the drier sites. It will take many years for the trees to grow to the proportions found in a natural swamp.*

must have 400 trees per acre standing 6 feet tall in five years. They've almost achieved that in two. Their success is due to two factors: it's a restoration project, rather than a wetlands creation, and the site is well chosen. The soil is still intact and the hydrology can be restored relatively easily.

"The key to our work here is that it's fitted into a functional landscape," says Lea. "I'd feel bad if it were sitting out on the cloverleaf of a highway because any wildlife that crawls in would likely be smashed. But this is hydrologically connected to the Scuppernong River corridor about a quarter of a mile away. So it's in a landscape where you're giving it a chance to function."

"We thought about that before we started," adds Frederick. "That's why we bought this other piece of land." He gestures to the other side of the swamp, where a 38-acre field and upland site adjoins NC 94. Frederick bought it last year to make one of the first private wetlands mitigation banks in the state. The wetland portions of the additional tract have been planted randomly with a variety of wetland trees. The species were chosen carefully for their adaptability to wet soils and the two foresters were careful about the origins of the seedlings they ordered, a critical factor often ignored by wetland restorationists.

"You can't order black gum seedlings from a nursery in East Louisiana and plant them in Virginia," Lea says. "Yet that's what's happening all the time. People say, 'This wetland failed.' But the wetland may have failed because there was a late frost and the plants weren't genetically suited to be planted that far north."

"The difference between what Frederick and Lea are doing and what other people are doing is that they have the scientific knowledge and they're not doing it on the cheap," observes Ferrell. "When you have people like that involved in a restoration project, the chances of success are higher."

***Though wetland restoration*** and creation are young sciences, both Lea and Frederick are optimistic that they will improve. That may well mean that the number of wetlands being restored or created will increase markedly. There may be a downside to that, of course. Right now, permit applicants have to show that they have tried to avoid or minimize impacts on wetlands before they are allowed to mitigate with restored or created wetlands. But as the science of wetlands creation and restoration improves, won't regulators experience more pressure to allow developers to opt immediately for mitigation?

"I don't think it will happen myself," says Frederick. "Regulators are constantly reminded that this may get out of hand and they are steadfast in the sequencing that must be followed. If they can keep that in the forefront, mitigation would continue to be the last resort."

For some, no matter how successful the science becomes, it still represents an imperfect exchange—a natural, functioning wetland for little more than a promise for the future. Even on Frederick's and Lea's field, where little cypress and juniper trees have been planted with care and forethought, who knows for sure whether a healthy bottomland hardwood forest will grow there someday? Who will check 50 or 100 years from now to see whether the promise has been fulfilled?

On the other hand, the careful work being performed by some practitioners augurs well for the young wetlands restoration and creation movement. The new techniques that are being developed may help offset the long hemorrhage of wetlands losses. "Regardless of all the legislation and all the regulations you have, there are going to be situations where humans will upset, alter or modify our systems," says Ernest Seneca. "I think we ought to have the techniques and procedures to put these systems back as quickly as we can."

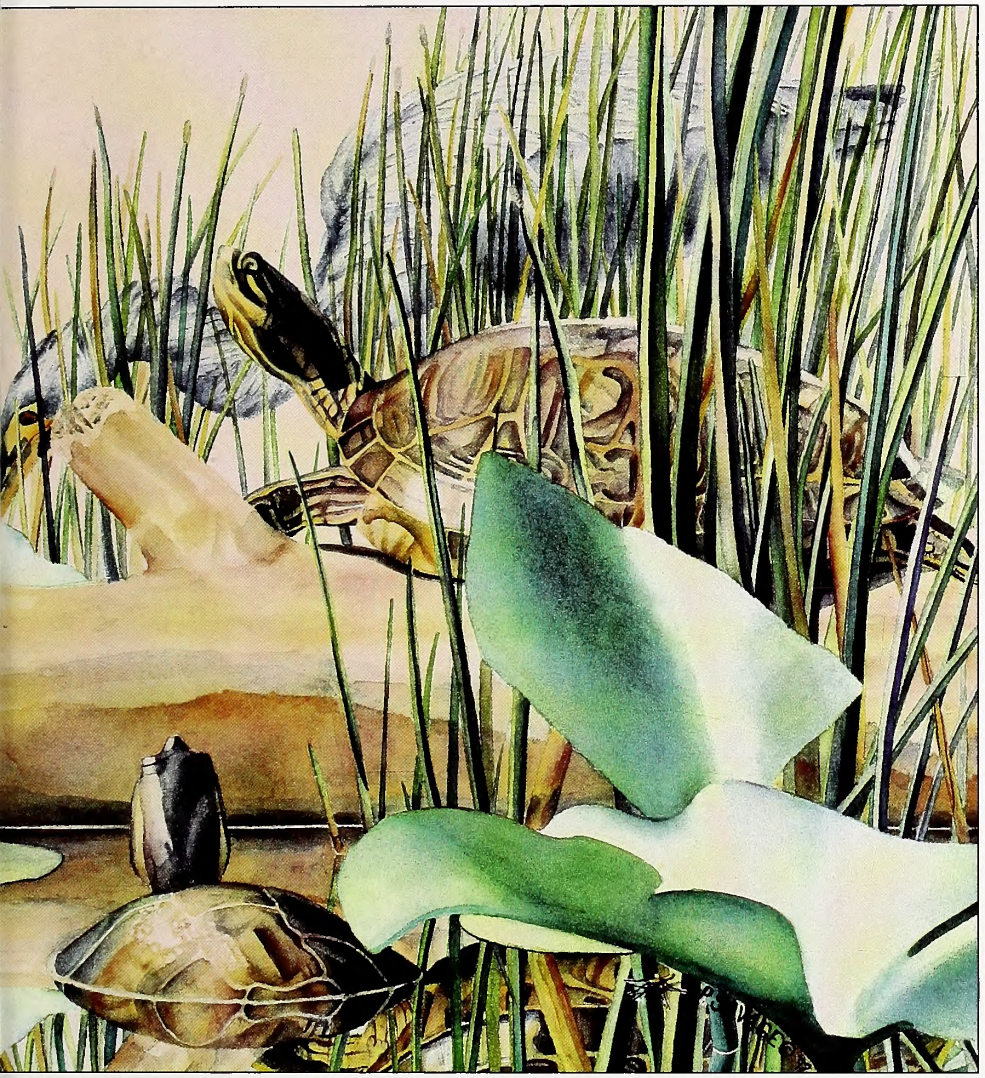
The alternative, Russ Lea reminds me, is grim. "This field could be soybeans next year. And I guarantee you, what we've done here is better than soybeans." ☐

courtesy Betsy Bennett

# *The Art of* Patricia Savage

This award-winning North Carolina artist sees nature in vivid colors, and often from unusual angles.

paintings by Patricia Savage © 1994



**Sunbathers**

***This painting*** *started with a long-simmering picture in my head, of being about 4 inches above a pond surface and staring up at a warm, sun-drenched log covered with outstretched turtles all in a row. Call it an "arriving turtle's eye view." I stalked the local lakes' sunning logs, sneaking close enough to shoot photos with enough detail to capture the turtles. I added the grasses and herons and various small creatures from other sources.*

"I paint to remember," says Raleigh artist Patricia Savage, and her work is proving to be memorable to many discriminating viewers. Just 10 years ago she was working as an illustrator for a commercial firm. After freelancing and acting as assistant art director for Spectator Publications in Raleigh, she gradually turned her attention to nature. Her watercolors have been so successful they have been included in such prestigious juried shows as the "Animals in Art" exhibition at Brookfield Zoo in Chicago, Ill., the "Wildlife Art in America" exhibition at the Bell Museum of Natural History in Minneapolis, Minn., and "Wildlife: The Artist's View" at the Leigh Yawkey Woodson Art Museum in Wausau, Wis.

She has this to say about her work:

"I believe that if nature art is to capture the essence of the animal and a place, it has to be accurate to the smallest details. The idea is to recreate the feeling of the world in a sharper vision, to pull your eye not only to the abstraction of colors and light and pattern but also to the wonders of living things. For me, it started with personal experience, a sense of places known in detail, learning slowly and richly.

"When I was young, I spent a lot of time in the woods behind our house, exploring everything. I learned the names of things, but more important, I learned a patch of woods. My mother introduced me to reptiles and amphibians by catching box turtles and letting my sisters and I keep them for pets. She would also pick up snakes and frogs and show us how to handle them. I took great delight in scaring the girls in the neighborhood when I discovered how squeamish they were about snakes and frogs. To earn a badge in Girl Scouts, I visited someone who kept a number of snakes in his basement. I remember being fascinated with all the different colors, shapes and patterns.

"The one time I ran away from home, taking all my books—no clothing or food—I headed into the woods. An hour into the *Bobbsey Twins* I began to hear the slow, intermittent sound of a snake moving through leaves. Listening carefully, I followed its movements and discovered the biggest copperhead I'd ever seen. To my 12-year-old eyes, it looked as thick as my father's arm and at least 6 feet long. I was so excited that of course I had to go home and get Mom, who hadn't time to notice that I had run away.

"My paintings portray 'windows in nature.' I enjoy getting eye level with frogs and turtles. I'm not interested in creating a traditional wildlife painting of a mammal in a large panoramic view. The subject matter I choose to paint has been heavily influenced by the time I spent catching crawdads on a bologna-baited safety pin, and lifting up wet rocks to find salamanders, and looking inside a beautiful flower to discover a perfectly camouflaged crab spider. I believe I can capture the experience by zeroing in on details of texture, light and ecology. I try to capture the animal image with such particulars as the slick, shiny scales of a juvenile blue skink, and I try to situate the animal in its world.

"To render the habitat down to the minutest detail takes not just the artist's and naturalist's hand and eye. I enjoy going to the library and learning all about the ecology of a species—what it eats, how it hunts, what it is eaten by, what time of day it comes out, what plants grow in the area and how dry or wet the area is.

"I also take pleasure in painting nontraditional species. In general, nature artists do not paint amphibians and reptiles, partly because of a lack of personal interest and a lack of public demand. Thus I was fortunate to be commissioned by CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) to produce several paintings of reptiles for a limited-edition book, *Endangered Species of North America.* CITES is a United Nations-sanctioned group that monitors the trade in endangered species. The project has been demanding and fun.

"Research into rare animals can be quite difficult. The rewards have fed all my desires in painting nature: I have met extraordinary scientists who taught me more about the natural world. I have been able to study and even handle species so rare they may soon be extinct. I hope that my art, demanding attention to the habitat as well as to the animal, goes some way to helping us save the full diversity of the world."

**Atlantic Ridley Sea Turtle**

***It is frequently*** *difficult to find captive endangered species to paint. I wanted this painting to show the biological diversity of the life in a coral reef. About 35 photographs were used as references for all the species, the color of the Caribbean water and the light infiltrating the water. In essence, everything in this painting is struggling to survive in the threatened coral reef ecosystem.*

**Tea Time**

***I had an easy*** *time finding the gila monster to study and photograph, and a difficult time finding dirt and rocks from the Sonoran desert. I called scientists all over the U.S. and Mexico. A chance conversation led me to Dr. William Schlesinger at Duke University who told me to come right over because he was getting ready to throw away dirt and rocks he had collected in the Sonoran!*

**Early Fall**

***This painting*** *was my second serious attempt to paint in watercolor. An instructor in a beginning watercolor class at the North Carolina State University craft center had brought in a large batch of resource photographs. I liked the abstract quality of a shot of snow and leaves. There are large masses of light and dark broken by the lines of twigs. The close view also reveals the textures and colors, moving from softness to sharpness. The smooth, white coolness of snow is etched in ice, repeating the shapes of the warmly colored leaves it envelopes.*

## Two Green Anoles

***I photographed*** *this* Storax *shrub at Lake Johnson in Raleigh. The anoles proved to be a bit of an unexpected problem because I couldn't find any in my yard that summer. I needed to see what the lizard looked like from below, especially for constructing its scattered shadows throughout the leaves. Finally, I built paper models and posed them along with a realistic rubber anole from a zoo gift shop.*

## Jack and Solomon

***These specimens*** *were photographed in a poplar cove forest near Burnsville. The sketch started as a full-fledged habitat painting with lots of different wildflowers and undergrowth. The more I sketched, however, the more intrigued I became with the abstract positive and negative spaces created by the interaction of these two plant shapes and by the patchy light and shadows of the old forest. The naturalist's eye sees detail, but also pulls patterns out of the setting.*

JIM DEAN

# Small Lures & Largemouths

If you're having trouble catching largemouth bass, try using small lures on light line.

written and photographed by Soc Clay © 1994

If you look closely through a professional bass fisherman's tacklebox, chances are you'll find a selection of very small fishing lures. They'll probably be hidden in some box because red-blooded American plug tossers might call 'em "sissy" lures.

I'm talking lightweight stuff here. In some instances, an 1/8th ounce would be considered on the heavy side. But that's what longtime bass pro Zell Roland used to place near the top in a B.A.S.S. tournament a few seasons back. When asked by one of his partners what he was fishing with, Roland had the answer. "Something you don't have," he said.

He was probably right. But times have changed, and more and more anglers—pros and amateurs alike—are discovering that ultralight lures are excellent insurance for those days when bass fishing gets tough.

Don Miller was an early bass fishing competitor from North Carolina who placed high in national bass fishing tournaments during the 1970s. He never owned a bass fishing lure weighing more than a quarter-ounce, and he didn't believe in using fishing lines stronger than 6-pound test, either.

Miller reasoned that any tournament fisherman who could load a limit of 12-inchers onto the scales at the end of each tournament day would go home with a check in hand more often than not. And the best way to do that, he believed, was to use light lines and tiny lures that were more apt to capture the attention of a prowling bass than spook it. His favorite tool for catching pressured bass in tournament conditions was a No. 2 Roostertail spinner. The Roostertail he liked best for largemouth bass had a white body with black spots and a nickel blade. He would switch to brown with a brass blade for smallmouths.

I guess you might say that I'm a Don Miller

***Bass can be** very picky about the lures they'll strike, but one trick that often works is to switch to light or ultra-light spinning tackle and try a variety of very small lures like these (left). This largemouth bass (above) was fooled by a small, straight-line spinner. It's an old lure, but it's still highly effective.*

kind of fisherman. The many times I've climbed onto the back casting deck of a tournament boat to observe pros in action has convinced me that if I wanted to make sure something pulls on the end of my line, I'd best use something mighty different from what my partners were throwing.

Homer Circle, the longtime fishing editor of *Sports Afield* magazine, phrased it best. "Catching a bass behind an accomplished professional angler is like trying to find a kernel of corn while walking behind a starving chicken," he once observed.

It's no big secret that most of the lakes in North Carolina see a whale of a lot of good fishermen, and the chances of catching a bass after these folks have prowled the shoreline aren't always good. But you can catch fish if you know a few tricks with small lures and light tackle.

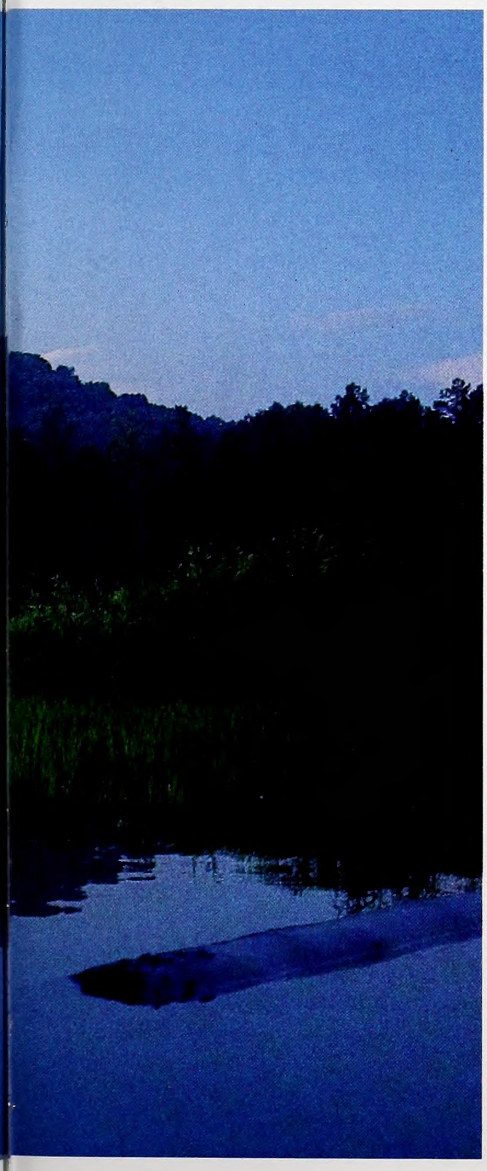
The late Marvin Clayborn, a top-notch smallmouth fishing guide in the upper South, was especially adept at catching trophy-size smallies from mountain lakes in North Carolina. His favorite weapon was a ⅛th-ounce, black hair jig dressed with a slender piece of black pork rind. In super clear lakes such as Fontana and Santeetlah, he fished these jigs on clear, 6-pound test monofilament using an open-faced spinning reel and a 6-foot, graphite rod. He caught bragging-size smallmouth in some unusual places.

Once when he and I were working a rocky point on Fontana Lake, he cast his jig and rind a foot onto the lakeshore, then hopped it into the water. A 3-pound smallmouth had that lure before it fell a foot! Why a fish of that size was in such shallow, clear water was a mystery to me, but Clayborn maintained that smallmouth bass often prowl the shallows of mountain lakes looking for crawfish or minnows. Clayborn reasoned that many fishermen ignore the shallows in mountain lakes because they believe that big smallmouth bass are always found deep. Or—and this is important—they had tried casting only traditional-sized lures into such places without success.

***You know the scenario** all too well. Georgeous afternoon, lovely water, perfect time of day—except that the bass refuse to hit your favorite lures. This angler solved that problem by switching to smaller lures that are less likely to spook bass in calm water.*

I once fished with a pot maker named Waggar from Asheville who knew exactly what Clayborn was talking about. His killer tactic called for two ⅛th-ounce, plain lead-head jigs tied a foot apart. One was tipped with a 2-inch smoke-colored Mister Twister grub; the other carried a chartreuse-colored grub. Waggar figured—and rightly so—that two small jigs provided enough weight to sink quickly, but presented small targets. Besides, he argued, he was offering two different colors at two different levels. He believed two lures were better than one, and often proved it.

Personally, I love to work pressured lakes all the way from top to bottom. I've had great success casting a ⅛th-ounce buzzbait for largemouth and spotted bass in lakes with woody cover. I bump the small buzzbait right into the cover and, the bass usually hit the lure when it careens away. A small jig tipped with hair or a grub will also usually catch about anything that sees it. Another favorite is Rebel's Deep Wee Crawfish. And remember the old Creme rubber worms that feature a three-hook nightcrawler harness with beads and a prop in front? Well, folks, I'm here to tell you that the miniature 2-inch version is nothing short of deadly—if you can still find them.



A favorite method I often use when fishing tiny jigs is to peg a small cork bobber to the line two feet above the lure and toss the offering around boat docks, into crappie beds or beside shallow weed lines. By dancing the bobber with the rod tip, the lure below is given just enough action to encourage a strike from any passing predator. It's a great way to catch bass and crappie, and you'll fool some bluegills, too.

Most bass fishermen know that miniature lures and light lines work well in winter, but some may not be aware that a 2- or 3-inch plastic worm fished with a tiny split shot pinched a foot up the line—or on a Carolina rig—can be one of the best cold-front lures there is. I've also seen those days when bass go deep in summer and refuse the most tempting natural baits. When this happens, a very small plastic worm can often make the difference.

A technique that is used successfully during summer conditions is to first locate fish holding near deep structure. Then, tie on a small purple-colored worm and crimp a small split shot on the line a foot or so ahead of it—enough to sink the offering fairly quickly, but not too fast. Knowing the right depth is important when fishing these so-called sissy baits in summer. A flasher, graph or LCR will tell you the correct depth, and on bluebird days, it is important to deliver the lure to the very nose of the fish. A good way to do this is to position the boat directly over the bass, and lower the lure all the way to the bottom. Then reel up enough line to place the offering at the approximate eye-level of the bass. At that point, a technique called "doodling" will often generate a bite.

Doodling works best with a 6-foot, highly sensitive graphite rod and a reel spooled with 4- or 6-pound test, low-stretch mono. Doodling is simply a matter of shaking the rod tip the instant a nibble is felt along the line. This sudden movement often triggers the reluctant bass to swallow the offering out of fear it is getting away. In some instances, I think this is just about the only way deep bass can be caught during strong frontal passages.

I've also had success doodling small plastic worms around boat docks and other woody cover found in shallow water. If there's a drawback to this kind of fishing, it's the constant attacks made on the lure by schools of bluegill and crappie. Some fishermen, however, wouldn't complain.

Another place where small lures sometimes work wonders for bass, especially from spring through autumn, is in the hidden nooks and run-ins that are usually plentiful on most lakes. I went fishing with Billy Phillips one hot summer day a few years back, and he promised me that we would catch bass from water no deeper than a foot, even though the air temperature was more than 100 degrees!

Phillips manufacturers a line of small spinnerbaits he calls Little Jewels. These spinners feature a No. 2 Colorado blade, but instead of using a lead head to tie the hook to the safety pin arm, he solders a small spinner blade between the hook and harness. This reduces the weight of the lure, making it sink more slowly, and he can fish it effectively in very shallow water. The design also helps, because when the lure is retrieved too rapidly, it turns on its side. Most bass anglers know that a slow retrieve catches more fish than a fast one, and this lure needs a slow retrieve to work properly.

Phillips convinced me that there are a certain number of bass that most always live along the bank in lakes that have wood or weedy shoreline cover. He proved it by catching several 2-pound largemouth that day, from water a foot deep.

By delivering his small spinnerbait softly to the shady side of partially submerged logs, limbs and stumps, he was able to garner more strikes from aggressive bass than I would have believed possible on such a hot day. And he was catching bass immediately behind a very busy marina—a place the local fishermen wouldn't have dreamed held bass. The key to this kind of fishing is to be careful not to make unnecessary noise that might frighten fish. You've also got to be able to deliver the lure very close to your target.

"Small lures catch everything. And what surprises many anglers is the quality of bass that bites these ultralight models," says Joe Heughs, public relations director for Rebel Lures.

For pressured lakes, Joe recommends throwing the little lures under boat docks, around boat houses and other woody shade-producing cover. By scaling down the size, the lure distinguishes itself as something different, something that appears helpless to a bass. He also believes that when bass become lure-shy, smaller lures can attract attention like no other artificial.

Another spot where small lures are effective is around dams where power generation or heavy rain runoff creates a current. Any cover or structure located in the discharge area will be holding a bass.

In places where Carolina rigging is called for, Joe likes to tie on a Teeny Wee Crawfish floater and attach it to the end of a 2½-foot leader behind a quarter-ounce sinker and swivel.

"Again, the problem with fishing this and similar size lures," Joe says, "is that you constantly have to take fish off the hook!"

Oh, to have such problems. ☐

YEAR OF THE COAST

# Fish That Fly

Whether they actually fly or simply glide, they can cover astonishing distances over the cobalt sea. How do they do it?

written by David S. Lee ©1994
illustrated by Duane Raver ©1994

I looked up to see a flying fish sailing past at eye level, 15 feet out of the water. I turned to the captain to ask if he ever had any land in his boat? While he was telling me that in 26 years of fishing in the Gulf Stream he never had, an 11-inch-long flying fish crash-landed on the deck below. I rushed down, secured my prize and hurried back to the bridge to ask Captain Baum if his boat had ever been struck by lightning. What I thought was the best one liner of the day was not appreciated. Harry Baum proceeded to recount the times his boat had been struck, how insurance companies refused to insure electrical navigational equipment, and how when....

For years, how flying fish flew was the focus of much debate. Did they flap their enlarged pectoral fins as birds and insects flap their wings? Careful observation and high-speed photographic images showed that flying fish swim forward and upward through the water at great speed. If their initial spurt fails to get them airborne the enlarged lower lobe of the tail, the only part of the fish still submerged, vibrates rapidly from side to side, up to 50 beats per second, oscillating until the fish achieves a taxi speed great enough for lift-off. This sculling motion is only slightly modified from how fish normally move through the water. On outstretched wings. . .excuse me, fins, these fish soar above the sea until they lose momentum and drop back into the sea. Sometimes they fold their fins, and with a splash, plunge beneath the waves. At other times their tail action again takes over and off they soar once more.

The conclusion from these observations was that flying fish don't actually fly. . .they glide. While I don't wish to make a big thing of this, there is some latitude for interpretation here. Dictionaries are not particularly informative in defining flight: "flight: act or mode of flying"; "flying: act of one that flies"; "fly: to move in or pass through the air." This subject demands common sense, not circular definitions.

Everyone would agree that hawks, bats, moths and airplanes fly and that canned hams, cement building blocks and box turtles don't. In between are a small number of things that seem, to different degrees, to fend for themselves against the pull of gravity—like red maple and dandelion seeds, parachutes and Tarzan. Also there are objects designed to minimize wind resistance that can be projected for considerable distances when hurtled into the air—Frisbees, cruise missiles and footballs, for example—but when left on

***Flying fish are** basically divided into two types—four-winged species like these Atlantic flying fish and two winged species. Flying fish use their flight capabilities to escape predators, and are common in the Gulf Stream off North Carolina. Their wings are actually fins.*

D. RAVER

their own each pretty much stays put. The next sequence of thought brings us to "flying" squirrels and lemurs, and "flying" frogs, geckos and snakes. It is generally accepted that these animals, using various skin flaps, appendage modifications and streamlined body designs, simply glide. After launching from a high perch these animals succumb to gravity, and come down gracefully in a downward swoop to a preselected landing site. They are parachutes with self-control and never achieve the kind of lift that would free them from the pull of gravity or create a force great enough to overcome the resistance of the air.

Flying fish, unlike paper airplanes or creatures that jump from high places, become airborne on their own power, by propelling themselves upward and then forward in a relatively straight flight path, parallel to the surface of the sea. They are not thrust into the air by an outside energy source, nor are they simply getting from point A to point B by jumping and gliding from a higher position to a lower one. They appear to exhibit considerable control over both their course and direction. Thus, the only real topic for discussion centers on whether or not bird-like wing-flapping is an essential part of the definition of flight. The Wright brothers didn't think it was, and nobody accuses albatrosses, which can soar for days on set wings, of not being capable of flight. Like conventional aircraft using a self-contained fuel source, or albatrosses that must run headfirst into the wind for takeoff, flying fish are quite capable of propelling themselves and flying for impressive distances before their forward momentum no longer provides enough lift to sustain flight. Frustrated marine predators who try to snatch them from the air believe they can fly, and so do I.

During the warm months, flying fish are commonly seen in the Gulf Stream off North Carolina. So at times when there is not much going on aboard ship, and when other creatures of the open sea are scarce, I watch fish fly. It's sort of a mindless pastime, but always interesting. The movement of the boat, or perhaps the sound of the engine, seems to make them take flight. Usually they take to the air when we are 20 or 30 yards away. Sometimes whole schools of 50 or more launch themselves simultaneously, but normally there is simply one here or two there. In the course of an hour it is not difficult to see several hundred. Sometimes I try to estimate flight distance or duration; I'm the sole scorekeeper in the Outer Continental Shelf fish Olympics. Watching flying fish I was reminded of the lines from Kipling's poem "Road to Mandalay." "Where the flyin'-fishes play, An' the dawn came up like thunder. . .," wishing I could recall more of the verses and wondering about the real order of the ones I remember.

After my earliest visits to the Gulf Stream, I combed libraries for information on flying fish. Information was scattered, mostly repetitious trivia, but in combination, an interesting dossier was pieced together. Much literature contained only summaries of the family Exocoetidae in general, keys to species occurring in various oceans and things like that. Of the 25 species known from United States waters, 17 occur in the Atlantic, including two species shared with the Pacific. The best I could figure was that about 15 of these have been found off North Carolina, but this number includes relatives like ballyhoo, halfbeaks and flying halfbeaks. Still, there are at least 12 species of flying fish that I could be seeing in the Gulf Stream. I could recognize five, perhaps six, different types, but really I had no way of knowing what species I was seeing. This predicament was somewhat alleviated by the fact that flying fish come in two basic models, two-winged and four-winged. The four-winged ones have both large pectoral and pelvic fins, and look a lot like little biplanes.

*"Flying fish, unlike paper airplanes or creatures that jump from high places, become airborne on their own power, by propelling themselves upward and then forward in a relatively straight flight path, parallel to the surface of the sea."*

Steve Ross, a friend who specializes in marine fishes, identified the specimen that crashed onto the deck of Captain Baum's lightning-wise charter boat as *Hirundichthys affinis*, one of the four-winged flying fish. Was this the species I was regularly seeing, or were there several types of large silvery, blunt-nosed, four-winged fishes about? The solution was to get more specimens. I had read that people in the Caribbean capture flying fish at night by placing a lantern next to a sail. The fish fly into the light, hitting the sail and flopping into the boat. I considered variations on this theme and then went out and purchased several boxes of No. 9 shotgun shells for my 12-gauge. It took one box of shells to see that I constantly shot well behind the fish, missing them by several yards. Sometimes I wasn't even that close. There was no speculating about the miss; the shot pattern clearly sprayed the water. My failed attempts provided the captain with great amusement and he delighted in announcing my score over the radio to the rest of the charter fishing fleet. The fish flew faster than I thought and it took a number of shells from the second box before I learned how far to lead them. Altogether I hit six or eight fish using two boxes of shells. We retrieved four specimens, the others sank. All of these were the same large, silver-colored, four-winged flying fish.

I have seen other types that are quite distinctive in coloration, but to date, I have been unable to collect or identify them. Except for *Hirundichthys*, most of these seem to live in sargassum. One is a small, inch-long species with tan, blotched wings that has a maximum flight distance of only several yards as it scoots from one sargassum patch to another. Another biplane type, with velvet black wings, also lives in the sargassum. It grows to 6 or 8 inches, but also seems limited to short flights. I have not seen flying fish of any kind in the winter months. Their seasonality suggests that they are migratory and are not simply being passively transported by the Gulf Stream.

Though flying fish are scattered widely throughout the warm oceans of the world, and I knew there were a number of local species I could watch, I really only had one identified. I limited my note taking to *Hirundichthys affinis*. I estimated the longest flights to be between 100 and 125 yards and they lasted for 10 to 12 seconds. (One Pacific species has been reported to fly a quarter of a mile.) Usually the fish flew less than a yard or so above the surface, but in strong winds sometimes they were lifted 6 to 10 feet into the air. Based on forward trolling speed of the charter boats I estimated flight speeds to be about 35 mph, partly explaining my difficulty in collecting specimens with a shotgun. In flight the fish angle upward, so the tail on takeoffs and landings always touches the water last and first. With their sculling tail movement they sometimes made two or three composite flights in succession or at times they ricocheted from the top of a wave and continued their flight. Each succeeding flight was usually shorter in time and distance than the one preceding it. Unlike the two-winged species, four-winged flying fishes exhibit a controlled flight even in a strong wind. While the two-winged varieties waft about erratically in the air, I observed that *Hirundichthys* flew straight or even banked and changed direction. On calm days the ripples of their lopsided, lobed tail fins remained in the water after takeoff.

The specimens I collected were from 10 to

12 inches long and weighed 97 to 258 grams. Pectoral fin lengths were from 5 to 6 inches, making the total wingspan somewhat greater than the length of the fish. By tracing out the wings on a piece of paper and calculating this area I ascertained that the wing-loading ratio (surface area of both pectoral and pelvic fins divided by the weight of the fish) was about the same as for Cessnas.

These flying fish were spawning off the Carolina coast in August. Dissecting the specimens showed that about half of the females had recently laid eggs and the others would soon. While not a shocking piece of biological information, observations, over time, add up to biological facts. I was impressed with the large swim bladders of these specimens. The same device that provides buoyancy for surface-scooting oceanic fish allowed the ones I collected to float long enough for me to scoop them from the sea.

Because of their small size, flying fish have an ocean of predators, but the ones I saw most eager to capture flying fish were dolphins. Rushing under them, cutting the water's surface, the dolphins tried to single out individual fish as they zipped off in different directions. While the flying fish can move through air at speeds of 35 mph, dolphins have been clocked at 37 mph. The slight difference in speed is only important in the initial charge; fast swimming speeds build up heat in muscles preventing extended chases. The flying fish, on the other hand, coast once they are airborne, covering long distances quickly with little energy. I never witnessed a capture. On one occasion I watched a large male dolphin below and a greater shearwater above both in hot pursuit of the same fish. The shearwater was snapping the air and the dolphin followed, but during the 150-yard chase the flying fish gave both predators the slip.

The large four-winged flying fish are well-designed for flight, and if the history of aviation were not so well-known it would be a logical, though incorrect, assumption that early aircraft were modeled after the fish's basic body plan. The two-winged flying fish can be compared to planes with a single pair of wings. The four-winged species are advanced designs for biplanes with underwings, which seem to function as elevators, staggered far back. In both types, the pectoral fins spread after the body of the fish has been lifted out of the water by rapid swimming. To open them beforehand would cause too much drag. Drag is further reduced because only the lower lobe of the tail fin is in the water, and power can be effectively added as needed until enough lift is achieved. Just before takeoff, the pelvic fins, which remain tightly folded against the body while the fish is on the runway, are suddenly and broadly spread and the fish gracefully rises into the air. These fins are constantly, and often independently, repositioned to keep the fish on course and the flight stable. The large wings remain fixed. This combination of decreasing resistance in the air and a strong sculling motion in the water is quite effective. Once the lower tail lobe leaves the water it immediately stops its oscillation. At this point the tail and tail fin are only used in turning like a rudder on a plane. The drag of the air is reduced because the fish doesn't require landing gear, and friction is slight because of its wet, mucous-covered skin.

Lift is obtained by the pair of (anteriorly placed) wings at the rear. The upper surface

***Four-winged** flying fish (top) are sometimes described as "bi-plane" species, while two-winged flying fish are described as "monoplanes." Four wings generally give the fish greater lift for sustained flight while two wings lend greater speed.*

of each wing is smooth and flush and the necessary mechanical strength is in the supporting fin rays that are found below, causing the lower surface of the fin to be ribbed. This arrangement reduces air turbulence on the upper wing and is important to lift. In the four-winged species, additional lift is provided by the pelvic fins and the body is square, the lower surface helping to increase lift, a design much like the fuselage of large cargo planes. The square-bodied, four-winged species have maximized lift and stability; the two-winged ones have speed. Stability is gained, with some sacrifice to flight, by the angle of both the pectoral and pelvic fins. Thus, all the wings tip forward several degrees, for longitudinal stability, and, in a dihedral angle not unlike a soaring turkey vulture, for lateral stability. The flight sacrifice is due to tipping which decreases the effective wing area. The dihedral angle of the wing reduces the length. Horizontal stability is controlled by distribution of weight. It can be roughly measured when the fish is viewed from the side. Like airplanes, about 51 to 53 percent of the fish is below a central axis running down the center of the body or fuselage. This slight shift in distribution of weight keeps it flying right-side up.

Additionally, the fish is weighted and balanced much like a weather vane that always pivots to face the wind. The flight, therefore, is self-correcting, heading the fish into the wind, assuring maximum lift. Actual tracking of flight shows it to be a compromise between the original course in takeoff and the direction and speed of the wind. Thus, the fish's nose points more or less into the wind while its flight path veers to the right or to the left.

All my comparisons to aircraft might be misleading. It must be noted that, unlike airplanes, flying fish need to get away in a hurry; where they eventually splash down is not critical. Landing accidents that would be disastrous for planes are only minor incidents for fish. There is nothing to break and the runway approach can be inprecise. They don't need pre-approved flight plans and seat belts are not required.

With flying fish qualifying for frequent-flyer programs, it at first seems curious why they, unlike birds, don't come in a greater variety of sizes. Most are between 6 and 12 inches and the largest, *Cypselurus californicus*, a southern California coastal species, is only 18 inches long. The answer lies in problems associated with initial lift-off, not the function of flight itself. The fish are straddling the life of two worlds and fins that are highly functional in one element are cumbersome in the other. Hindered by this problem, the fish have difficulties in the transition and resistance of the water. Sea planes encounter similar problems in escaping the pull of the water and getting airborne.

And there is one other adjustment. The flying fish's lateral line is not down its side as in most fish, but near the belly. I assume this is the logical place for a sensory device that only works under water when its owner insists on doing belly flops all over the ocean. It's one in a long list of adjustments necessary for successful fish flight. Understanding these adjustments is important, but I regret that the information learned has been used as "evidence" for the school of thought that these fish don't fly. Even if technical reasons beyond logic force them to be regarded as mere self-propelled gliders, they are still fun to watch. Then, too, there are always the flying squid. . . . ☐

*Buffleheads, Oak Island Lighthouse Featured*

# This Year's North Carolina Duck Stamp on Sale Now

*Written and Edited by Vic Venters*

The 12th edition of the North Carolina waterfowl stamp features a trio of buffleheads with the Oak Island lighthouse in the background. World renowned painter Phillip Crowe of Franklin, Tenn. painted the scene. To date, Crowe has painted over 25 state duck and conservation stamps and numerous prints for private conservation groups like Quail Unlimited and Ducks Unlimited.

The Oak Island lighthouse is located at Long Beach. Completed in 1958, the lighthouse is the U.S. Coast Guard's newest reinforced concrete tower. The silo-style tower was erected by using the Swedish-developed moving slip form. By this method, concrete was poured and once that portion had dried, the form was moved up to complete another section. The color is integrated into the concrete with the top third black, the middle third white and the bottom third gray.

At 2.5 million candlepower, the Oak Island lighthouse is the most brilliantly lit lighthouse in America and is second in brightness only to a lighthouse located on the English Channel in France. The tower's powerful lights and parabolic mirrors allow Oak Island's beacon to be seen over 24 nautical miles out at sea.

"This is the next to the last of the lighthouse series," said Sidney Baynes, Chief of the Division of Conservation Education. "The lighthouse series has been so popular with collectors that other states are now adding lighthouses to their prints."

Baynes said publicized reports indicate the North Carolina stamp and print program is among the top three in the nation and that North Carolina prints and stamps are widely sought.

***Phillip Crowe's painting*** *of a trio of buffleheads off the Oak Island Lighthouse at Long Beach is the subject of this year's North Carolina Duck Stamp and print.*

The N.C. Wildlife Resources Commission began the waterfowl stamps and print program to raise funds for waterfowl conservation, including acquiring and improving habitat. Purchase of the stamp was voluntary until 1987 when it became mandatory for waterfowl hunters to possess the stamp.

Monies from the sales of stamps and prints go into the Wildlife Commission's Waterfowl Fund. Since the inception of the program, more than $2.4 million has been raised. These funds have aided in the purchase and habitat improvement of Conine Island in Bertie County, the Whitley and Whitaker tracts on the lower Roanoke River, Hunting Creek Swamp in Davie County and White Oak Impoundment in Onslow County. Funds also go to Goose Creek waterfowl impoundment management, aid in goose research and restoration, equipment purchases and help in meeting the North American Waterfowl Management program aimed at restoring waterfowl populations in North America.

State waterfowl stamps will go on sale July 1 from licensing agents for $5 each. The stamp and print series may be ordered now from independent art dealers. Retail price is $141.

For more information, contact the license division, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

*Call In and Charge It*

# Credit Cards Accepted for Licenses, Magazine

Hunting and fishing licenses, as well as regular and lifetime subscriptions to *Wildlife in North Carolina*, are now only a phone call and credit card away. Callers can now dial the N.C. Wildlife Resources Commission, speak to an operator and order most resident and out-of-state hunting and fishing license by VISA or MasterCard. This will also make purchasing subscriptions to the Commission's popular magazine, *Wildlife in North Carolina*, much easier and faster.

The number to call is 919-715-4091. Those purchasing licenses by telephone will be eligible to hunt or fish immediately after the telephone call. They will be issued an identification code and license number during the call and their license will be mailed within two working days.

To ensure that the telephone transactions go smoothly, callers should have paper and pen to record their identification code and license number. They should also have their credit card and driver's license or Social Security number in hand. To purchase a hunting license, applicants must have held a hunting license prior to July 1, 1991 or have successfully completed a certified hunter education course.

Licenses that will be available to residents or nonresidents are annual Sportsman, Comprehensive Hunting, Comprehensive Fishing, Basic Fishing and Basic Hunting. Nonresidents may also purchase short-term 6-day Hunting, 3-day Basic Fishing and 3-day Comprehensive Fishing Licenses.

Credit cards can also be used to order regular and gift 1-year, 3-year and lifetime subscriptions to *Wildlife in North Carolina*.

Magazine prices are still only $7.50 for a one year subscription or $20 for a three year subscription. The sale of magazines by telephone and credit card is a new service, and is part of the Wildlife Commission's increased emphasis on better serving its customers.

*It's Quick with Your Credit Card*

## Boat Registration Renewals Now Available by Telephone

Instantaneous credit card renewals for North Carolina boat registrations are now possible by calling a computerized boat registration program at the Wildlife Resources Commission's motorboat registration section.

Boaters whose current registrations are expiring may now call and renew registrations by either MasterCard or VISA. This renewal program is currently limited to boaters who are renewing for three years and who are not changing addresses or other information on the registration card.

Boat owners desiring immediate registration should call 1-919-981-2541 and follow instructions. To take part, boat owners should have access to a touch-tone telephone and have their credit card and registration information in hand. The call usually takes three to four minutes. When the credit card company accepts the transaction and the call is completed, the registration is valid and recorded in the Wildlife Commission's computer system. Enforcement officers checking boats will be able to verify renewal by radio if needed. A new valid decal and registration card will be mailed to the boat owner within the next few working days.

Wildlife Commission officials point out that the system will not only be convenient and quick, but will also be cheaper than purchasing one-year renewals. Cost of a three-year registration is $20 while the cost of three one-year renewals is $24, reflecting a saving of $4.

Boaters who wish to purchase new registrations, purchase one-year renewals or make changes on their renewal cards will still need to mail the necessary information to the Wildlife Commission's Motorboat Registration Section or take the appropriate information to an authorized boat agent. People buying boats must still process their registration applications by mail through the Vessel Registration Section, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Those who want to process registrations in person should go to the new address at Chapanoke Road in Raleigh. For more information, call (919) 662-4373 or (919) 662-4375.

*Painting Features Bears*

## New Sportsman's Stamp Print Available

A female bear and her cubs are featured on this year's edition of the N.C. Wildlife Resources Commission's Sportsman's print and stamp series.

The painting for the combination print and stamp was painted by Robert C. Flowers, a North Carolina resident who was raised in the Blue Ridge foothills of Virginia.

Flower's works are also included in numerous corporate and private collections and have been exhibited in New York, London and throughout the Southeast.

Each year a different game of fish species is selected for the stamp design. Prints and stamps will be available through Dec. 31. Wildlife Commission policy requires that unsold art prints and stamps be destroyed six months after the stamps expire as legal licenses. This measure limits the numbers of prints and stamps available on the market, thereby increasing their values as collectibles. For more information, contact local art dealers or the license section of the Wildlife Commission at 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

***This year's** North Carolina Sportsman's Stamp Print features Robert C. Flower's painting of a female bear and her cubs in the Appalachian mountains.*

## July Brings Buckarama

The N.C. Wildlife Federation and the Lincolnton Sportsmen's Club are sponsoring the 4th annual Carolina Buckarama in July at Charlotte's Metrolina Expo Center. The show will run July 29 through 31.

The Buckarama is an exhibition of seminars, speakers and more than 150 vendor booths featuring pre-season prices on the latest in hunting equipment and accessories. A hunter safety clinic will be offered. Free seminars will also be conducted by the following: Gary Sefton, a champion deer caller; Galen Shinkle, trick archer and bowhunter; Sammy Schrimsher, trophy buck management specialist; and Ken Knight, a Wildlife Commission biologist and expert on trophy buck management.

Admission is $6 for adults, $3 for children and seniors. For more information, contact Lisa West at the N.C. Wildlife Federation at (919) 833-1923.

*Easily Modified for Farm Ponds*

## New Plastic Fish Attractors Designed for Reservoirs

The N.C. Wildlife Resources Commission has begun placing new all-plastic fish attractors in some North Carolina reservoirs to improve fishery habitat. The design can be easily modified for use in small ponds and lakes by private owners.

The fish attractors are made from sheaths cut from 55-gallon plastic drums, PVC pipe and old steel sign posts. As algae grows on the submerged attractors, baitfish flock to the cover to feed and hide, thereby attracting larger fish. The Wildlife Commission has for years made attractors out of wood or discarded Christmas trees. While wood attractors are excellent, they eventually rot and must be replaced.

The plastic and PVC attractors should last for many years, and can be designed to optimize underwater horizontal cover. In addition to being lighter, larger and more stable than wooden attractors, they are also more resistant to snagging by lures or tackle. There are other benefits that may allow their placement in waters that have traditionally been off-limits to supplemental fish attractors.

"As brush and trees decay, they release methane gas, which puts a bad taste in drinking water," said Keith Hendrickson, a fisheries technician and biologist with the Wildlife Commission. "We came up with the idea for PVC trees because they will not rot and are therefore more suitable for adding structure to a municipal water supply lake. We hope to be able to add these to some municipal water lakes that often have most woody debris removed."

By the end of March, the PVC attractors had been placed in lakes Thom-A-Lex, Tillery, Norman and Freedom Park Lake in Charlotte. At Freedom Park Lake, Wildlife Commission fisheries biologists are also experimenting with different attractor designs. "That lake was drawn down and reimpounded last year," said Hendrickson. "When they did that, every piece of cover was removed from the lake bed. Because of this lack of native cover, we essentially have a clean slate to work with. We've placed several different types of new attractors in the lake. All are accessible from shore and we will be analyzing catch rates and fishing success on the attractors to determine which type works best."

Freedom Park Lake has been stocked with channel catfish and bluegills and is one of the Wildlife Commission's award-winning Community Fishing Program lakes.

While the fish attractors placed in reservoirs are relatively large, the PVC and plastic design can be modified easily for small farm pond use. Formica scraps and plastic milk or soft-drink bottles can be substituted for cut barrel sheaths. There have been similar commercial attractors marketed in recent years, but it is far cheaper to make them from drum scraps and PVC.

KEITH HENDRICKSON

**Wildlife Commission** *fisheries biologists have recently begun experimenting with plastic fish attractors in several Piedmont lakes. A wide variety of freshwater game fish are attracted to the plastic structures and fishing success generally improves around them. Plastic attractors have several advantages over traditional wooden attractors, including durability and lightness. The design can be easily modified for farm ponds.*

*Trotline Hotline*

## Don't Use Live Baits on Trotlines

Dear Editors:

I was reading the article on trotlining "Cats on the Line" in the August 1993 issue when it said, "The flathead, however, wants its food live and kicking, and it is usually taken on live bream or other bait fished just off the river bottom."

I am afraid you have mislead some people since it is a violation of North Carolina law to use live bait on a trotline. Since the article is about trotlining you should have been specific and cautioned people to only use live bait on a rod and reel and not use it on a trotline.

—*Patrick Ponsonby*
*Hertford*

*Editor's Response: You are correct about live baits and trotlines. North Carolina law states, "It is unlawful to use live bait with trotlines or set hooks (jug hooks)." However, the author never advocated the use of live bait on a trotline in his article and specified that he used cut bait for his trotlining. But your clarification is appreciated.*

*Book Review*

## *The Bounty of the Earth* Cookbook

*The Bounty of the Earth Cookbook by Sylvia Bashline. Published by Lyons and Burford, 31 West 21 Street, New York, New York 10010, 1994, Softcover, 266 pages.*

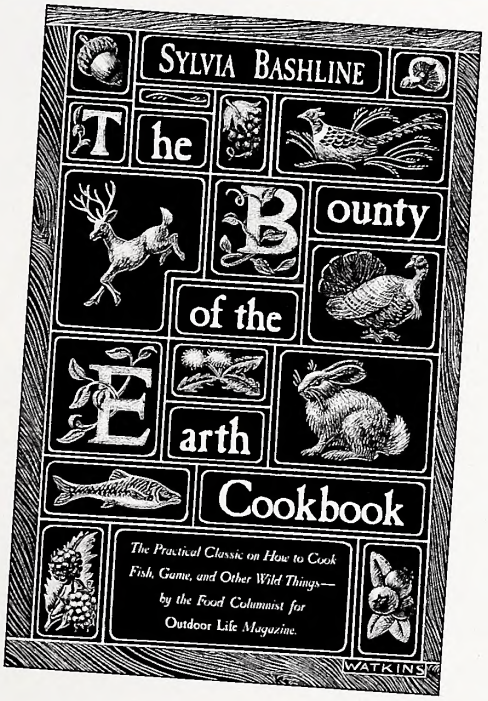
First published in 1979, Sylvia Bashline's *The Bounty of the Earth Cookbook* may be the finest cookbook of its type published in America. In her introduction to the 1994 reprint, the author—who is the food columnist for *Outdoor Life*—writes, "It's my personal conviction that game and fish recipes should be easy to prepare; the ones in this book are, and the ingredients are readily available in most stores."

This philosophy underpins the recipes found in *The Bounty of the Earth* and is, I believe, the book's greatest strength. There are a number of other fish and game cookbooks that may concentrate on more sophisticated recipes, however none combine elegance with classic simplicity as well as Bashline's.

Classic simplicity, I should add, does not mean deep fried in oil or baked in cream of mushroom soup until tasteless and tough. Bashline's recipes are varied and innovative and most chapters contain a discussion of the wine best suited for each particular species or individual recipe.

*The Bounty of the Earth* has separate chapters on cooking almost all of North America's popular upland gamebirds, waterfowl, big game, and fresh-water and saltwater fish. The are also chapters on making sausage, cooking with smokers, clay pots and Dutch ovens, as well as chapters on cooking and eating wild greens, mushrooms and nuts.

Even as hunting has become increasingly unpopular with urban America, game and fish cookery is, paradoxically, enjoying a renaissance in recent years, as many Americans have rediscovered the health advantages




of eating plants and animals untainted by chemicals and hormones. Because of its inclusive nature, this book may have real crossover appeal to many who do not hunt or fish. And in that perhaps tolerance can be learned. If I had one cookbook to recommend on cooking and serving "wild things," *The Bounty of the Earth* would be it.

—V.V.

*Court Takes Dim View of Night Lighting*

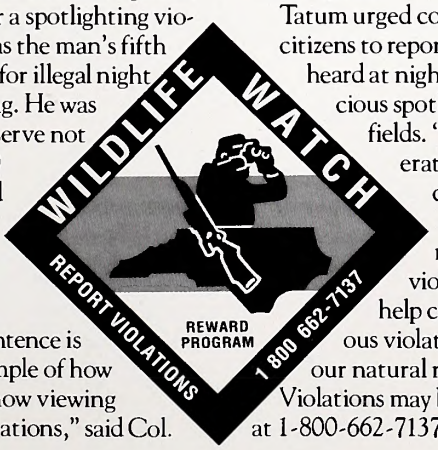
## Repeat Wildlife Offender Gets Prison Term

Repeat offenders for wildlife violations are finding courtrooms less and less friendly these days.

A Lenoir County man received up to two years of active prison sentence for a spotlighting violation. It was the man's fifth conviction for illegal night deer hunting. He was ordered to serve not less than 20 months and no more than 24 months in prison.

"This sentence is a good example of how courts are now viewing wildlife violations," said Col. Robert Tatum, chief of the N.C. Wildlife Resources Commission's Division of Enforcement. "The crimes of repeat wildlife violators are not being taken lightly."

Tatum urged concerned citizens to report shots heard at night or suspicious spotlighting in fields. "The cooperation of the courts and citizens reporting violators will help curb this serious violation against our natural resources." Violations may be reported at 1-800-662-7137.




## State to Host Safety Tournament

Davie County will be the site for this year's North American Hunter Education Invitational from July 18 to 22, a national shooting tournament for winning hunter education teams from states, as well as teams from Canadian and Mexican provinces.

The national tournament will be hosted by and held at Yadkin Point Shooting Preserve in Advance. The Invitational is sanctioned by the Hunter Education Association.

A total of six teams—three from junior divisions and three from senior divisions—will represent each state or province that attends.

The six teams from North Carolina were winners at the N.C. Hunter Education Tournament held in Salisbury in Rowan County at the Rowan County Wildlife Association.

Representing the N.C senior champion team contingent are first place winners Forbush High School of East Bend; second place Currituck High School of Barco; and third place John A. Holmes High School of Edenton.

The N.C. junior team contingent is made up of first place winners Fall Creek Elementary of East Bend; second place winners Forbush Elementary of East Bend; and Burgaw Middle School of Burgaw.

Events at the tournament will include competitons in shotgun, rifle, archery hunter skills and muzzle-loading categories.

The tournament offers students from around the state and nation a chance to demonstrate skills learned in hunter safety education classes.

In recent years, hunter education courses have become mandatory in many states for first-time hunting license purchasers.

*Call Before You Catch*

## Check Saltwater Gamefish Regulations

STEVEN A. WILSON

***The N.C. Division of** Marine Fisheries can provide anglers headed for the North Carolina coast with regulatory information regarding changes in size and creel limits for a number of saltwater sportfish. For more information, contact the agency at: N.C. Division of Marine Fisheries, P.O. Box 769, Morehead City, N.C. 28557-0769, or call 1-800-682-2632.*

## Wildlife Endowment Fund Report

**April 1994**

Principal Balance
$19,446,530.16

Interest Earned
$13,770,569.19

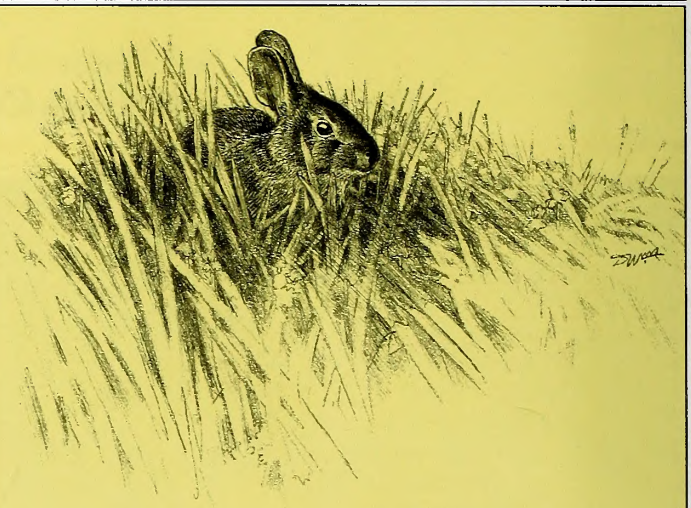
Total Receipts
$33,217,099.35

Interest Used
$5,175,203.48

Fund Balance
$28,041,895.87

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# A Cutting Question

*by Vic Venters*

While we usually like to tell you what to do to improve wildlife habitat, July—or any midsummer period—is a good time for us to tell you what *not* to do. Mowing large areas now—such as pastures or fallow fields—will come at a high cost to ground-nesting wildlife such as bobwhite quail, wild turkeys, rabbits and various songbird species. Because July is peak nesting time for many animals, mowing can destroy both young and nests. If at all possible, don't mow every year because mowing can increase the effectiveness of predators, particularly in winter when escape habitat is at a premium.

If mowing is necessary, landowners or managers should postpone it as late into the summer or fall as possible. A new video titled *Conservation Mowing* shows both private or corporate landowners the best times to mow or not mow and provides tips to minimize harm to ground-nesting wildlife. Although produced in the Midwest, the 26-minute video features tips from around the country, including those from a landowner near Kinston.

Specific strategies applicable to the Southeast include blade-mowing heights that control weeds and minimize harm to wildlife, spot-mowing techniques for tree management and control, preserving cover in winter, and tactics that allow wildlife to escape a field that is being mowed.

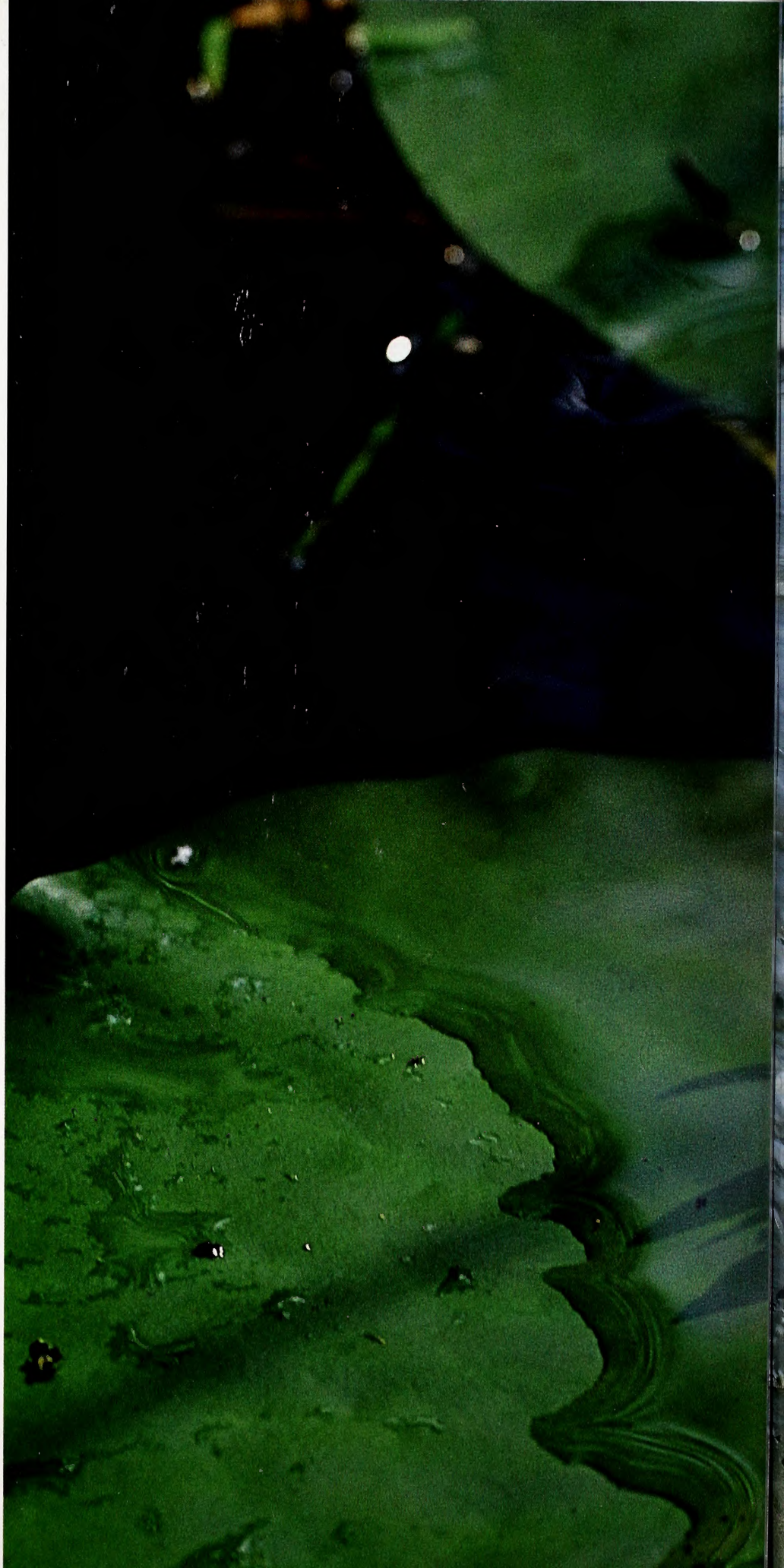
While the video was produced by Quail Unlimited, the effects of mowing affect many more species than quail and should be of interest to anyone who has to manage open-ground areas.

Copies of *Conservation Mowing* can be purchased for $10 each. The video may be ordered from: QU Mowing Video, R.1, Box 88-A, Stendal, Ind., 47585. Make checks payable to: QU Ag Fund. *Conservation Mowing* was coordinated by the Quail Unlimited Ag Committee, with support provided by Wildlife Forever, The National Fish and Wildlife Foundation, Quail Unlimited and 42 QU chapters.

# A Small Price Tag for Wildlife

When you buy a wildlife license plate, you'll be helping North Carolina's nongame and endangered wildlife. Ask your local license plate agency or call 919-733-7510 for an application.

NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND



## Wild Beauty

Various species of water lilies are handsome symbols of the blackwater rivers, Carolina Bays and swamps of eastern North Carolina. This is the fragrant water lily, one of the common wild species. Many attractive hybrid lilies are grown in garden pools.

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# WILDLIFE IN NORTH CAROLINA

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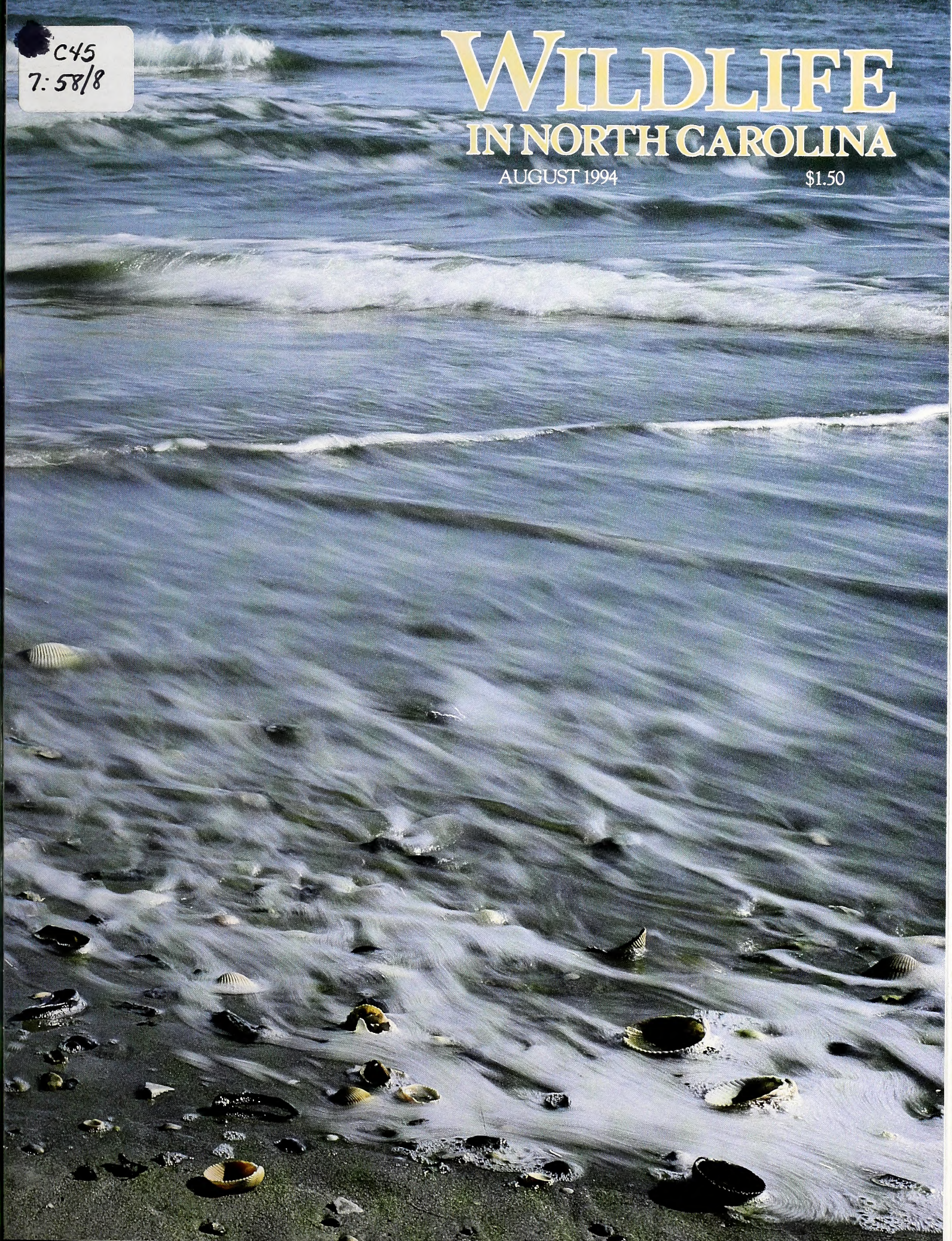


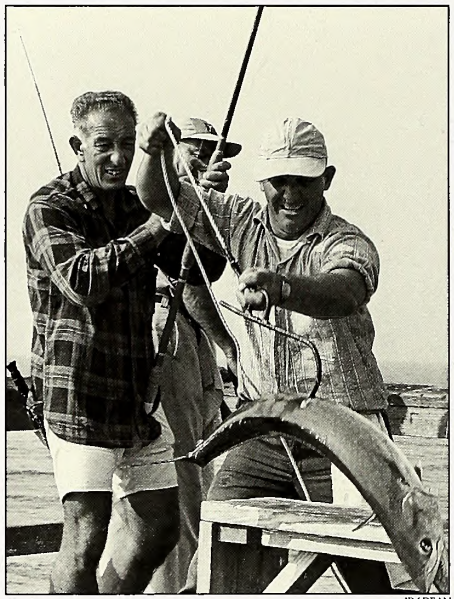
# The King in Eclipse (Part I)

*by Jim Dean*

On the end of the Emerald Isle Pier, things looked pretty much the same as always. A few fishermen were casting for the random Spanish. Others sat and talked or worked on tackle. Their anchor rods were tied vertically into the corners of the pier, the tips bent sharply by lines running drum-tight to heavy sinkers set as far as you could throw them. The actual fishing rods were propped in notches on the rail, their slack lines bellied out to live baits held beneath the anchor lines by breakaway clips or rubberbands. Occasionally, one of the baits—usually a bluefish, menhaden or thread herring—would skitter in circles, flashing an invitation to any large passing predator.

"Fat chance," I mumbled to myself, watching the baits. "You may be safer down there with a treble hook in your back than I am up here."

I had, after all, just left the pier house where, by habit, I'd noted the year's tally for king mackerel. As of mid-June, not a single king had been caught on the pier. Had you told pier fishermen in the late 1950s, '60s and '70s that such a thing might someday be possible, they would have laughed at you. In those days, many piers from Cape Lookout to South Carolina were recording 70 or more kings a season, and on piers north of Hatteras, action could be even faster with 20-king days not unheard of. Even so, the entire annual pier catch in North Carolina probably never exceeded 2,000 to 4,000 kings even in the very best years.



JIM DEAN

*El Tavasso, Elmer Bland & Pete Leo about 1962.*

These pier-caught kings were not the little offshore "snakes," but averaged 15 to 20 pounds and sometimes exceeded 40. You seldom saw one less than 12 pounds. Also, these big inshore adults were not school fish; they were largely solitary hunters except in spring and fall when they were migrating or stalking forage in loose packs.

Very few king mackerel are caught from ocean piers anymore; indeed, they have made little more than cameo appearances for at least a decade. Over an entire season, a pier's total now ranges from zip to half a dozen, rarely more, and that's true not only on the 30-odd piers along North Carolina's coast, but elsewhere along the mid-Atlantic. It is an amazing loss, yet understandably overlooked as saltwater fish populations everywhere decline precipitously.

And yet, the demise of pier fishing for king mackerel is remarkable because its birth and death has occurred in an eyeblink. This kind of poor man's big-game fishing was virtually unknown prior to about 1950, but its popularity grew rapidly in the '60s and peaked in the late '70s and early '80s when the inshore population mysteriously began to disappear.

I hooked my first king on a live bait in 1952 from a Long Beach pier that was washed away by Hurricane Hazel two years later. In those early years, there were only a handful of anglers riding herd on rambunctious bluefish free-floated under big corks, but the reward was a chance to catch large mackerel, cobia, drum or other glamour species, even tarpon. Later, as more fishermen joined the fun, innovative pier fishermen developed the two-rod system of anchoring a live bait to keep it from tangling with nearby baits. Even so, this has always been a sport for patient souls.

Years ago on the Emerald Isle pier, I saw a big king snatch one of a dozen baits and tear off nearly 200 yards of line even though it was dragging several other lines and floats. That was normal, however, and other fishermen worked to clear the lines. Alas, the fisherman who was watching his line melt off the spool had no experience in these matters.

"If you don't cut your lines, I'm going to," he screamed as he whipped out a big knife. We backed away. The fisherman slashed at one of the offending lines and cut it—his own, it turned out. He stared in disbelief for a long moment, then gathered up his gear and walked off the pier. We watched in silent astonishment, scarcely able to believe that justice could be so wonderfully swift and equitable.

I've spent many happy hours baking on the spindly ends of piers up and down the coast. When the Emerald Isle Pier was steel and there were only four cottages between it and Bogue Inlet, I was being raised by fishermen like Pete Leo, Rachel and El Tavasso, Mal Boyette, Elmer Bland and Ralph Carter. When El died years ago, and Elmer passed on this spring, we lost parts of our extended family. But very few of the old hands still put out baits, and the diehards who do seldom have a strike.

"I see a lot of float-fishing tackle at yard sales and flea markets," one old friend said sadly. "I don't even bring my stuff out here anymore."

But, like me, he finds old habits hard to break, and this past June we leaned against the rail and quietly fished among our memories while the sun set over the long pier behind us.

---

*(Next month, Part II: Speculation on the disappearance of inshore king mackerel.)*

August, 1994
Volume 58, Number 8

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

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## CONTENTS

4 **Life in a Mountain Stream**
*written and photographed by Harry Ellis* © 1994
*Is there a more handsome and fascinating web of life than that found in the pristine waters of a clear mountain stream?*

10 **Specks and Spot-Tails**
*written and photographed by Joe Malat* © 1994
*When spotted sea trout and puppy drum run the sloughs at dawn, some say it's the best light-tackle surf fishing in the world.*

14 **Beaches From Above** *photographed by Conrad H. Lowman* © 1994
*The dynamics of our ever-changing coast create artistic patterns that can best be seen from aloft.*

20 **Environmentalist at Large**
**A Carolina Profile**
*interview by Lawrence S. Earley and A. Sidney Baynes*
*photographed by Melissa McGaw*
*Dr. Tom Quay's legacy to the modern environmental movement can be found among the countless students he taught at N.C. State University.*

24 **Just When You Thought It Was Safe . . .**
*written by Peter K. and Catherine E. Meyer* © 1994
*illustrated by David Williams* © 1994
*Not to scare you away from the beach, but there are a few marine hazards you ought to know more about.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

**Nature's Ways** *by Lawrence S. Earley*

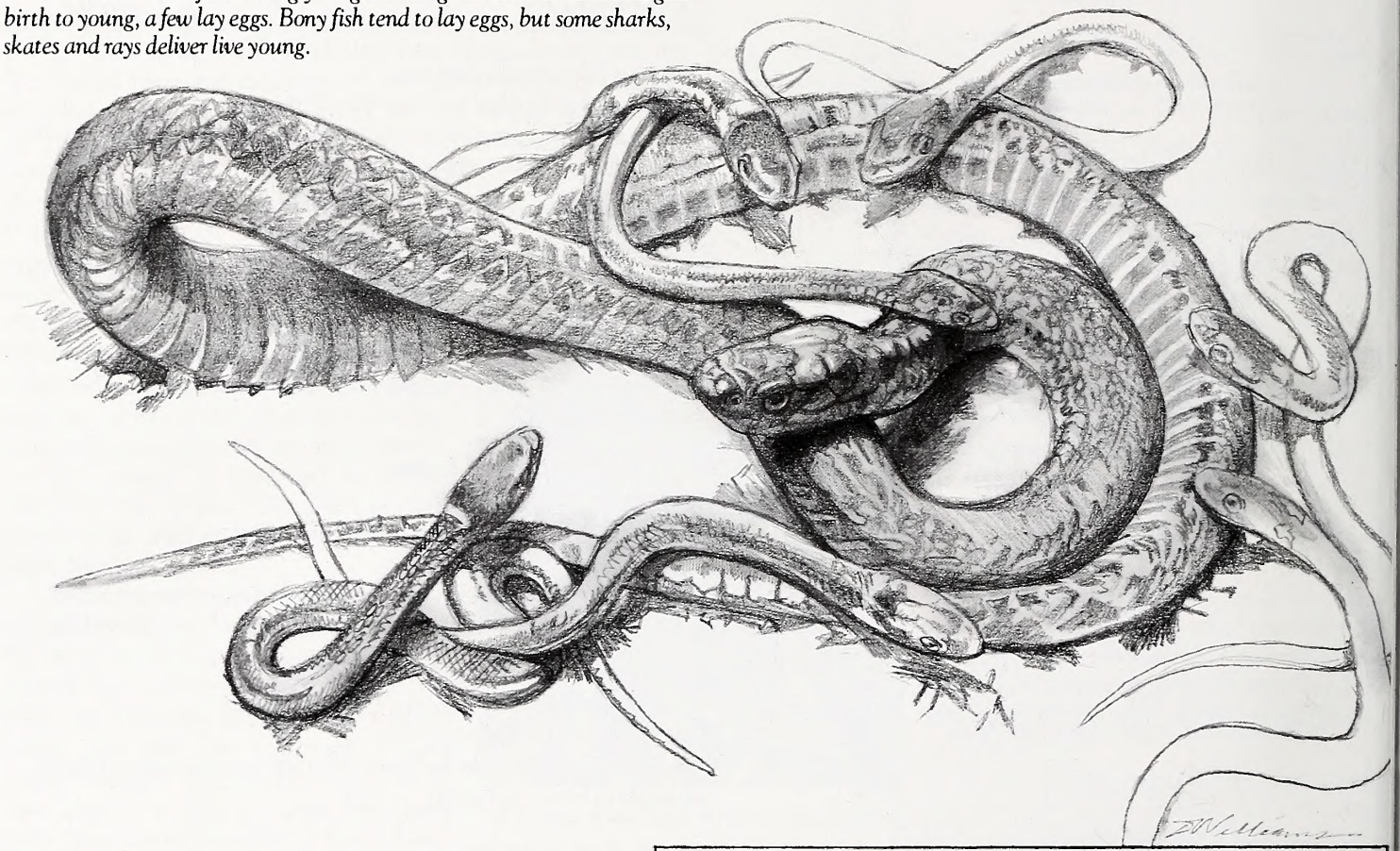
**Back of the Book** *by Vic Venters*

**Wildlife Through the Year** *by Vic Venters*

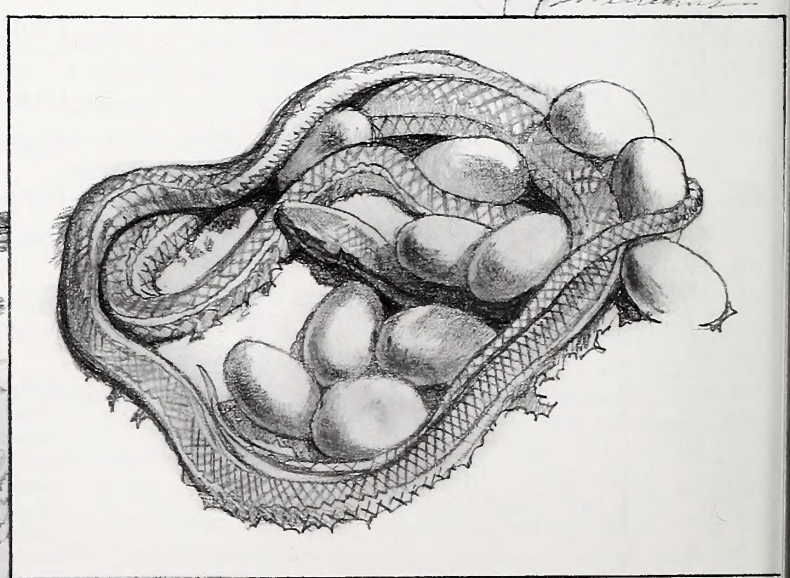
**Cover** *The gentle surf, bright sunlight and a scattering of seashells are invitations to the season of vacations. Photographed by Ken Taylor.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

**A new generation** *of redbelly snakes crawls away from their mother after being born. Eighteen snake species in North Carolina are live-bearing (viviparous); 19 are egg-layers (oviparous). The reptiles are not the only animals to evolve two methods of delivering young. Although almost all mammals give birth to young, a few lay eggs. Bony fish tend to lay eggs, but some sharks, skates and rays deliver live young.*



**When the baby** *rat snake is ready to hatch, it frees itself from its egg prison by using its egg tooth, a temporary tooth that curves forward from the upper jaw. Almost all live-bearing young have an egg tooth, even though it serves no purpose. Live-bearing snakes are a more recent evolutionary development than egg-layers.*



**The black racer** *is an egg-laying or "oviparous" species. Early in the history of life on earth, reptiles evolved the hardened egg enabling them to emerge from water and colonize terrestrial habitats.*

# Reptiles and Their Young

*written by Lawrence S. Earley/illustrated by David Williams*

Poking around the rotting boards of a dilapidated cabin in the woods, you may as likely come across a copperhead as a black racer. Both are found just about anywhere in the state, in similar habitats and eating similar foods, mainly insects, birds, amphibians, other reptiles and small mammals. Of course, there are differences between them. For one thing, the copperhead is venomous and the black racer isn't. And the racer's young hatch from eggs while the copperhead gives birth to live young.

Egg-laying snakes are called "oviparous," after Latin words meaning "egg" and "giving birth." Their eggs have a flexible, parchment-like texture. Before reptiles evolved, female amphibians laid their eggs in water, the males discharged sperm nearby, and the eggs were fertilized in a haphazard sort of way. After hatching, the young passed through several vulnerable larval stages before they reached adult size. Reptiles were the first animals to fertilize their eggs internally and this had several enormous advantages. Packaged within a protective shell with enough food (yolk) and water inside, embryos could develop totally inside so that when they hatched, the little snakes were already miniature versions of their parents, ready to hunt. In addition, the egg-laying reptiles could lay their hardened eggs on land and thus colonize a vast number of terrestrial habitats. (See "The Amazing Egg," April 1993.)

Live-bearing (viviparous) snakes took another step by keeping their eggs within their bodies. Early on, a small yolk sustains these snakes' embryos, but soon they are nourished by food provided by the mother's body. A viviparous female could thus protect her young from predators by keeping them inside her until the moment of birth. Also, a viviparous snake wasn't as tied to temperate climate conditions as an egg layer, whose eggs needed warm temperatures in which to incubate and hatch. Whatever environment was comfortable for the viviparous mother was also right for her babies.

This may be why so many snakes that inhabit cold climates or high altitudes are live-bearers. In these conditions, the benefits of live birth seem to have outweighed those of egg laying. Aquatic reptiles also tend to be live bearing and it's no coincidence that the venomous snakes are mostly live-bearing as well. Among North Carolina's venomous snakes, only the coral snake lays eggs. It is true that the copperhead and other snakes retain their eggs inside them until just before they hatch. Typically these eggs are covered with a soft membrane, rather than a hard shell. Herpetologists sometimes call these snakes "ovoviviparous," but most consider this phenomenon merely an intermediate form of viviparity.

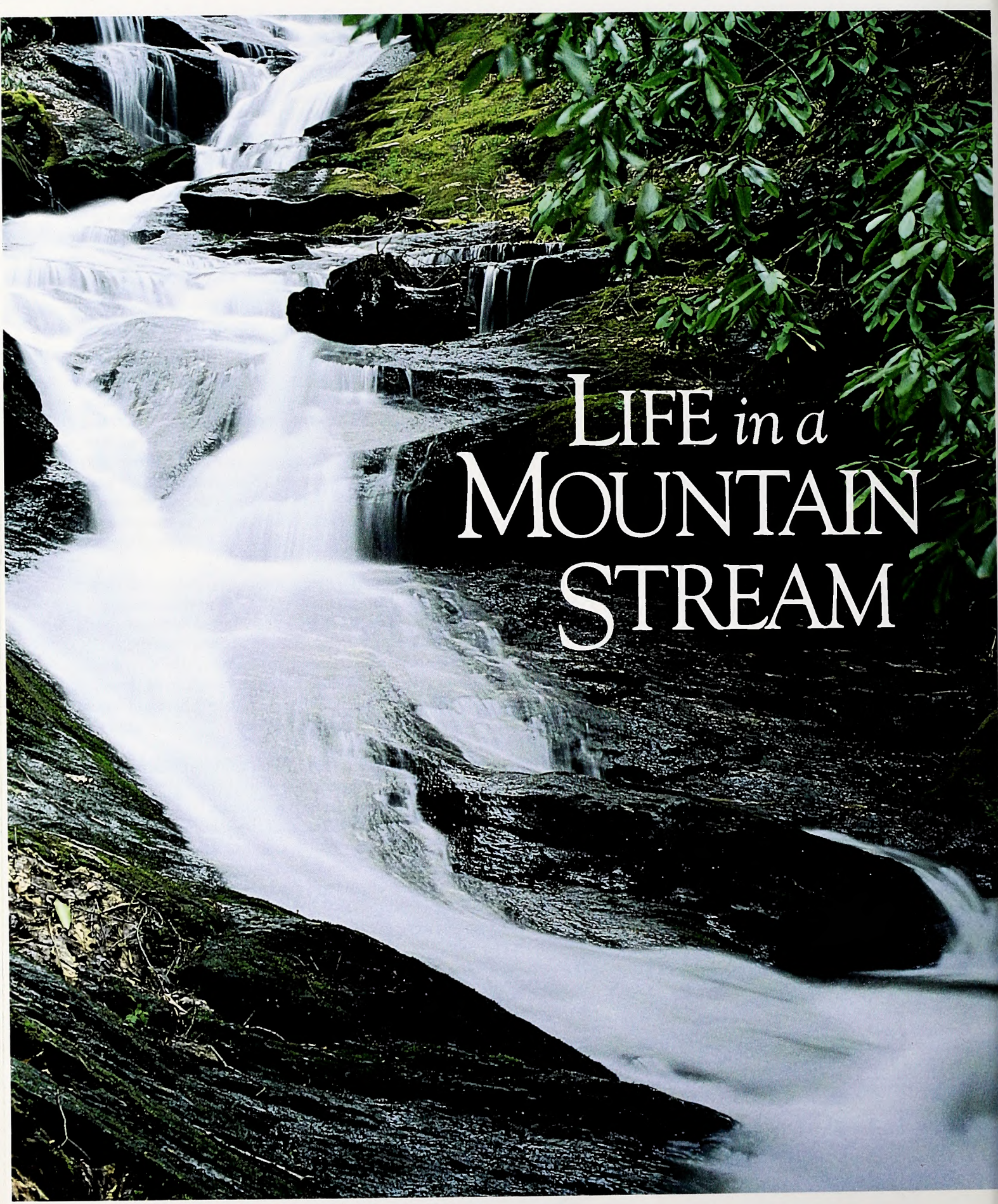
One unusual reptile species, the European common lizard, is an egg-layer in one part of its range and bears live young in another. Yet most reptiles seem to have adopted one method or the other. Viviparous young are born with a vestigial egg tooth, evidence that live-bearing snakes evolved from those that laid eggs. Other evidence can be found in the large number of venomous snakes that are live-bearing—the hollow fangs and heat-sensing pits of these snakes are considered recent additions to the reptile line.

Though copperhead and black racer have adopted very different strategies for delivering their young, both work well and have stood the crucial test of time. The young of the two snakes emerge fully formed, ready to fend for themselves in the world at large.

## NORTH CAROLINA'S SNAKES

| Species | Live-bearer/ Egglayer | No. of Young |
|---|---|---|
| Worm snake | egg layer | 1 to 8 |
| Scarlet snake | egg layer | 2 to 6 |
| Black racer | egg layer | 4 to 25 |
| Ringneck snake | egg layer | 1 to 10 |
| Corn snake | egg layer | 3 to 27 |
| Rat snake | egg layer | 5 to 25 |
| Mud snake | egg layer | 4 to 104 |
| Rainbow snake | egg layer | 20 to 52 |
| Eastern hognose snake | egg layer | 4 to 60 |
| Southern hognose snake | egg layer | 6 to 10 |
| Mole king snake | egg layer | 6 to 17 |
| Eastern king snake | egg layer | 5 to 20 |
| Eastern milk snake, Scarlet king snake | egg layer | 4 to 16 |
| Eastern coachwhip | egg layer | 4 to 16 |
| Redbelly water snake | live bearer | 5 to 55 |
| Banded water snake | live bearer | 9 to 57 |
| Northern water snake | live bearer | 8 to 50 |
| Brown water snake | live bearer | 10 to 30 |
| Rough green snake | egg layer | 3 to 12 |
| Pine snake | egg layer | 3 to 12 |
| Glossy crayfish snake | live bearer | unknown |
| Queen snake | live bearer | 5 to 23 |
| Pine woods snake | egg layer | 2 to 4 |
| Black swamp snake | live bearer | 2 to 14 |
| Brown snake | live bearer | 3 to 27 |
| Redbelly snake | live bearer | 2 to 21 |
| Southeastern crowned snake | egg layer | 1 to 4 |
| Eastern ribbon snake | live bearer | 2 to 20 |
| Eastern garter snake | live bearer | 7 to 101 |
| Rough earth snake | live bearer | 2 to 9 |
| Smooth earth snake | live bearer | 2 to 14 |
| Eastern coral snake | egg layer | 2 to 9 |
| Copperhead | live bearer | 3 to 14 |
| Cottonmouth | live bearer | 3 to 14 |
| Eastern diamond-back rattlesnake | live bearer | 7 to 18 |
| Timber rattlesnake | live bearer | 5 to 19 |
| Pigmy rattlesnake | live bearer | 3 to 13 |

*Information from Bernard S. Martof et al.,* Amphibians and Reptiles of the Carolinas and Virginia *(Chapel Hill: University of North Carolina Press, 1980).*



# LIFE *in a* MOUNTAIN STREAM

# Is there a more handsome and fascinating web of life than that found in the pristine waters of a clear mountain stream?

written and photographed by Harry Ellis ©1994

Throughout the southern Appalachians—including the Great Smokies and the Blue Ridge—thousands of miles of clear, swift boulder-strewn streams course down the mountainsides where spruces and firs, maples, oaks and beeches shade their rushing waters. There are over 4,000 miles of mountain streams that sustain trout populations in North Carolina alone. Along their banks, wake-robins nod and ferns cast their delicate shadows. In the mountains, water is everywhere, trickling from springs in little runs and rills, surging down from the heights, uniting and forming brooks, then larger streams—all ceaselessly moving toward the sea. They sculpt the landscape, nourish wildlife and sustain the forests.

There is nothing more delightful or beautiful than a mountain stream musically splashing over moss-covered boulders. Its cold, highborn water is a symbol of all that is pure and unspoiled in a world where the great silences are gradually being replaced by the vibrating roar of engines. No two streams are alike, and a stream is never quite the same around the next bend.

Mountain brooks may flow for several miles through rough terrain and rugged ravines before reaching the slopes of lower-lying valleys, where, as the result of the confluence of many smaller streams, they carry more water. Many are good trout streams, even supporting fish in their tiny headwaters.

***Mountain streams** are host to an astonishing variety of aquatic life, particularly when their waters remain pure and unpolluted. This species of bright red crayfish (Cambarus sp.)—shown above emerging from its burrow—is frequently found in small mountain streams, as are a number of other less colorful crayfish species.*

Something within me craves the sight and sound of rushing waters, and I like best the smaller streams of the higher elevations. Their names are of little consequence, but each has its own mood and character. Nothing fascinates me more than poking around in a swift mountain brook. I like to turn over rocks or use a small dip net or piece of screen wire to capture and observe at close range some of the creek's smaller inhabitants, organisms that are able to survive only because the moving current continually brings an unfailing supply of food and oxygen. Fish, tadpoles and salamander larvae take dissolved oxygen from the water

as it passes over their blood-rich gills.

In our higher North Carolina mountains, one is never far from the sight and sound of running water. Each stream, large or small, has its own musical qualities, voices that sing and shout, murmur, chuckle, laugh and whisper. But often when you strain your attention to listen, they disappear completely, and only the steady roar of the rapids remains. More than once when I have been alone by the rushing waters of a wilderness stream, I could have sworn that human voices were approaching, though evidently no one was within miles.

Like a magnet, a mountain stream draws to itself a dynamic community of living creatures, both along its banks and beneath the water. There may not be as many species as in a pond, for example, but it is a special habitat for highly select organisms that are remarkably adapted to survive under the never-ending pressure of the swift, icy waters.

A native of these streams is the colorful brook or "speckled" trout (*Salvelinus fontinalis*). An aristocrat among fishes and a fisherman's dream, it is prized so highly because of its beauty, its eagerness to take a lure, its fighting qualities when hooked and its excellent taste for eating. Brook trout from different areas and streams vary greatly in the size that they attain. Those of our North Carolina mountains are relatively small, usually considerably less than 12 inches in length. To survive and prosper, trout must have clear, cold, well-aerated water, not much above 65 degrees, and free of chemical pollution and sewage. The introduced brown and rainbow trout can tolerate water temperature a little warmer, and, to the delight of anglers, these once-alien species are doing well in our mountain streams.

While exploring these streams, I sometimes stop and take a nostalgic look over my shoulder at my years as a trout fisherman. Flashes of memory take me back to other days and other clear streams, gleaming in the morning light or in the gold of the setting sun, and to the men with whom I shared these experiences. Some of them have taken the trail across the Last Great Divide, but their companionship and the events of those times are still vividly etched in my memory, though it has been over 40 years ago.

In addition to trout, many of these streams are teeming with several other kinds of fish. More than 70 species have been collected from streams in the Great Smokies alone. They include many kinds of minnows, suckers, stone rollers, chubs, daces, darters, shiners and sculpins. A curious dweller in our streams is the sculpin or miller's thumb (*Genus cottus*). It is a grotesque-looking little fish, seldom over 5 inches long, with a head that appears too large for its body and huge, fanlike pectoral fins.

Certain aquatic insects, like mayflies, stone flies and caddis flies, are important links in the ecology of a stream. In their immature stages, they are a vital part of the food supply of trout and other game fish. They subsist on plankton and microscopic plants like algae and diatoms that furnish pasturage for so many water-dwelling creatures. Also, these nymphs are good indicators of water purity, for they cannot live in streams that are polluted, poorly aerated, or low in oxygen content, and their absence from a stream may be a significant indication of its contamination.

Though it may have lived as a drab, bottom-crawling nymph for a period of three years, the life of the adult mayfly, order *Ephemeroptera*, is astonishingly short, often lasting but a few hours. Poets and philosophers have long

***Some denizens of*** *mountain streams include (from left to right): case-building caddis fly larvae, which construct protective cases from tiny rocks or other underwater debris; adult caddis flies, identifiable by their "tent-shaped" wings; a giant stonefly adult; water striders, which skate along in the surface film; and the mayfly, which transforms itself from an aquatic nymph to a delicate and short-lived winged adult.*

**The longtail salamander** (Eurycea longicauda) *lives in only a few watersheds in North Carolina. It is often found along rocky streams or in damp caves nearby. Fishing spiders (right) are aptly named: they have the ability to dive underwater to catch insects, tadpoles and tiny fish. The fearsome-looking hellbender* (Cryptobranchus alleganiensis) *is a large salamander that can grow over 2 feet in length (opposite). It is becoming rarer, as it can live in only the cleanest of streams.*

mourned its swift-approaching death. It apparently exists for one purpose only: to perpetuate its kind before it dies. A single female may lay a thousand or more eggs, numbers that ensure the future of the species in spite of the many dangers that await the newborn nymphs. After mating, the male dies almost immediately and the female lives only long enough to drop her eggs in the water, from which a new generation will arise. Trout are so fond of mayflies that anglers pattern many of their artificial flies after them.

Stone flies, order *Plecoptera*, are also important items of food for many forms of stream life. The long, flat-bodied nymphs are often seen clinging to the underside of rocks that are turned over in a swift brook. The winged adults are poor fliers and seldom travel far from the stream.

Adult caddis flies, order *Trichoptera*, are small mothlike insects, active only at night and rarely seen. The larva is a little soft-bodied water grub that is very vulnerable to every predator in the stream. As a means of survival it builds for itself a little elongated house or protective case, using the materials that are readily at hand. Some species use small twigs, others small pebbles of the proper size and shape. Whatever the materials used, they are fashioned and glued together with a viscous mortar-like silk that issues from the larva's body. Each species builds its own specific style of case, unlike that of any other. Some cases are portable, and the larvae, after attaching themselves to the inside, drag them along as they feed among the rocks and debris on the stream bottom, retreating inside when danger arises.

In most streams, crayfish are in overwhelming abundance, serving as food for many higher animals, including fish, turtles, snakes, large wading birds and raccoons. Most people call them "crawfish" but professional zoologists prefer the name crayfish. There are many different species, most of them colored in drab shades of brown, but some are heavily pigmented with various colors, including orange-red and blue. During the day these crustaceans hide under rocks or in burrows, but they come out at night to forage for food. When the female lays her eggs, she attaches them to her swimmerets, located under the abdomen, where after they hatch the baby crayfish also find a safe haven.

Life also abounds above the water, where bright-winged dragonflies and damselflies patrol the stream, flying low over its surface to capture small flying insects. On a still, glassy pool, water striders skate over the surface film, whirligig beetles gyrate in dizzying circles, while fishing spiders (*Dolomedes*) run gracefully across the pool searching for insects, which they normally prey upon, though they sometimes dive below the surface to capture tiny fish and tadpoles.

An interesting inhabitant of streams and brooks is the parasitic leech, *Glossiphonia*, with attractive chocolate markings. It will attach itself to almost any vertebrate, including man, for a blood meal.

A strange resident of our larger clear-running streams is the giant hellbender (*Cryptobranchus alleganiensis*). The largest of southern Appalachian salamanders, it commonly reaches a foot and a half in length and is totally aquatic, and because it cannot live in streams that are polluted, its numbers have declined drastically in recent years.

The shovelnose salamander (*Leurognathus marmoratus*) is another species that never leaves the water. It is found in cold, fast-flowing streams of our higher mountains up to 5,500 feet in elevation, where its mottled brown coloration makes it very difficult to see among the varicolored pebbles on the stream bottom.

An abundant brookside species is the Blue Ridge two-lined salamander (*Eurycea bislineata wilderae*). The female attaches her eggs to a submerged rock and closely guards them until they hatch. The closely related longtail salamander (*Eurycea longicauda*), with a tail almost two-thirds of its body length, also lives along streams, though it sometimes strays a considerable distance away from water.

The Blue Ridge spring salamander (*Gyrinophilus porphyriticus danielsi*) is found in cold mountain brooks and springs along the North Carolina-Tennessee border. The young retain their gills and live in the aquatic larval stage for as long as three years, when they will have reached a length of 5 inches or more.

Green and pickerel frogs sit along the mossy banks gulping insects and plunge into the water when alarmed, while water snakes hunt for prey along the edge of the stream. The most formidable predator of all, the snapping turtle, lurks in silent ambush, with only its head extended above the water.

From time to time, over the steady roar of the rapids, comes the wild, rippling song of the Louisiana waterthrush. In spite of its name, it is not a thrush at all but a little brown warbler with a speckled breast and a white eyebrow stripe. By looking closely at the water's edge, you may see the singer, incessantly bobbing and teetering, as it pokes under leaves and in crevices for food or actually wades into the stream to capture small creatures. Its nest is usually built near the stream, under the exposed, arching roots of a tree.

A mountain stream is part of a highly fragile web of life, a community of living creatures where each individual life touches many others, and no part of it can be radically changed without disrupting the whole structure. Clear-cut a forest next to a stream or allow silt or chemical toxins to enter the water, and the fish can die along with many other forms of aquatic life. The trout in its pool and the rare orchid on the bank are at the mercy of the lumberman or the careless camper who fails to put out his campfire. When the trout and the wild orchid are gone, part of the stream's wild beauty has gone with them.

The laughter of running brooks, the sound of wind in the spruce trees, the cry of wild birds, the beauty of an autumn landscape, an orange moon and a whippoorwill calling, speckled trout in a cold mountain stream—what are these things worth? Little or nothing, perhaps, in dollars and cents or economic wealth, yet they are just about the best things on earth, bringing a relaxation that no psychiatrist can give, and filling ancient needs and longings that are still a part of us. In the wilderness and along mountain streams, one must never be in haste to end a day. There are too few of them in a lifetime. ⛛

# Specks and Spot-Tails

## When spotted sea trout and puppy drum run the sloughs at dawn, some say it's the best light-tackle surf fishing in the world.

written and photographed by Joe Malat ©1994

It's pitch black and dead calm. Still a half hour until first light. Silhouetted against the lights of the Nags Head Fishing Pier, I can barely see a handful of anglers. They are scattered along a short stretch of beach, each one casting artificial lures into the calm surf.

Time passes, my mind is wandering. I'm casting and retrieving on autopilot, and the only sound is the periodic slap of the small waves breaking on the beach at my feet.

Suddenly, to my left, I hear the high-pitched staccato sound a spinning reel makes as a good fish runs out line in strong, short spurts. I strain my eyes to pierce the semidarkness, but I can't see many details. As the angler drags his prize high and dry on the sand, the thick body and blunt nose of the fish tell me it's a puppy drum.

I hear someone else down the beach with a fish on, and I start to get edgy, impatient. My autopilot is disengaged, and I'm working the lure, feeling my lead head jig bump the sand and the Wiffle tail swim against the current as I move it through the surf.

Three more casts, no fish. What's the deal?

My lure flutters to the bottom, the line suddenly comes tight and pulls away. I'm hooked up. It's give and take as seconds pass. The fish is so close I could reach out and touch it with my rod tip, and suddenly it comes halfway out of the water and shakes its head. Soon, I drag a beautiful speckled trout, glistening in the predawn moonlight, up on the sand at my feet.

My hands start to shake. They always do when I catch the first one, not knowing if this is the first of many, or the only trout I'll catch that day. But I really don't care. The first one is the best.

A grizzled, salty surf caster once told a very impressionable teenager, as we both stood ankle deep in the suds, that speckled trout were a gentleman's fish. "A good speckled trout angler has skill, finesse, and a fair amount of luck," he half muttered, half boasted as he brought a trout to the beach on almost every cast while I couldn't buy a strike.

I dearly love speckled trout. Catching them is fun, but I just enjoy fishing for them. They often bite best at the first light of day, when the wind hasn't made up its mind what to do and the ocean can be as calm as a backyard birdbath.

To catch them is not a matter of mustering all of your strength to cast 8 ounces of lead and a big gob of bait a hundred yards. Light tackle, small rods and reels, and an effective, sometimes delicate, presentation of the lure are the keys. I suppose that's what the old man meant by the term "gentleman's fish."

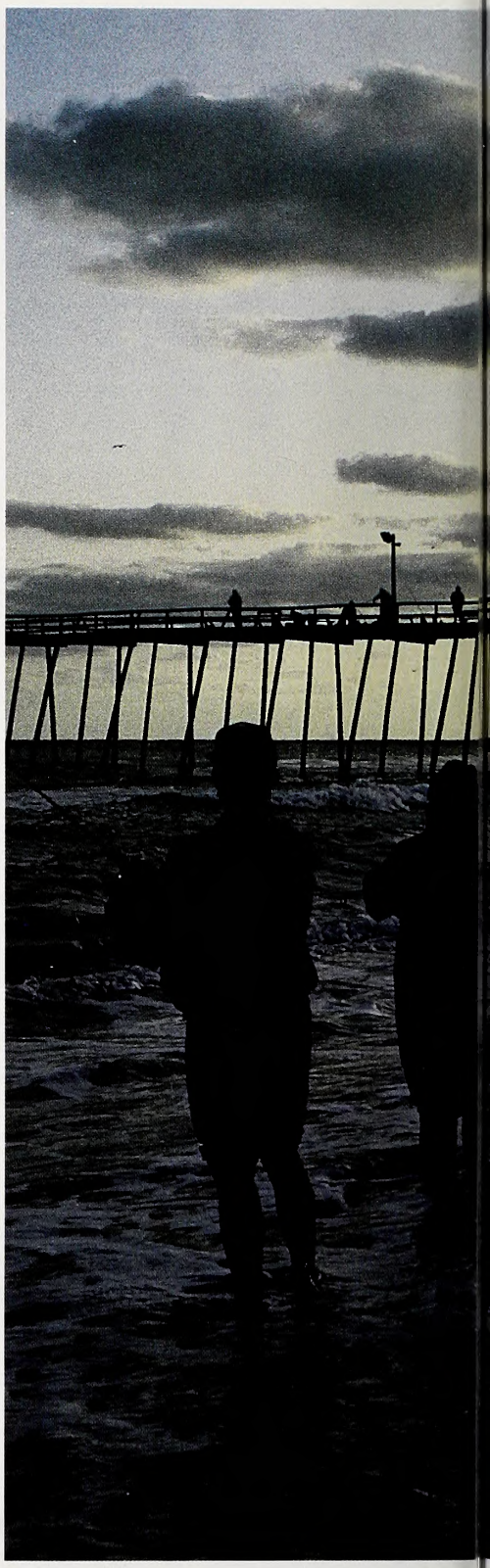
These splendid fish are available in varying numbers from the North Carolina surf almost nine months a year. A few specks are caught from the Outer Banks' beaches in the spring. Small fish, rarely weighing more than a pound, may cooperate sporadically during the summer.

But the fall is the time to pursue speckled trout from the beach.

I fish for them on the beaches north of Oregon Inlet, between Nags Head and Kitty Hawk, and the peak of the season along those beaches is late September through October. The trout may linger for a while longer—if the big blues don't arrive early. The specks will then vacate the premises to keep from being eaten by the foraging bluefish. Specks can be in the Hatteras surf well into December, if the weather cooperates.

Speckled trout will eat almost any kind of fresh bait, but most veteran trout anglers prefer to fool them with artificial lures. Spinning rods in the 6- to 7-foot class mated to light saltwater reels filled with good quality 8- or 10-pound test monofilament line will cover any situation. The light line is necessary to cast the small lures but heavy enough to handle the biggest trout, provided the operator has a delicate touch with the reel's drag.

MirrOlures, molded from hard plastic to resemble small baitfish, are a traditional



***It is not** mere convenience that attracts fishermen to the surf just north of an ocean pier. Often, the action of the waves near a pier will cause the slough to be deeper here, and at dawn in the fall, such places often yield good catches of spotted sea trout and puppy drum.*

favorite. A trout's preferred lure color may change from day to day, but proven hues are red and white, green and occasionally a flashy hot pink color. A couple years ago, when this bright color consistently took fish, I was skeptical, but its track record has been proven.

The key to catching speckled trout on a MirrOlure is an effective retrieve. That usually means a slow retrieve, with an occasional twitch of the rod tip to make the lure jump. Canny veterans will often work a MirrOlure with the rod tip pointed down toward the water, better to feel the swimming action of the lure through the rod.

MirrOlures may be traditional favorites, but lead head jigs and soft plastic tails are equally popular with both fish and fishermen. Head weights vary from ¼ to ½ ounce, and the lures are occasionally rigged in tandem.

The most effective tail color or style is a source of constant debate among speckled trout aficionados. Brand names such as Mr. Wiffle, Tout, Mr. Twister and Gotcha are standards. These tails come in every color of the rainbow, but each year a predictable range of the spectrum accounts for most of the trout.

Regulars prefer lime or dark green, white, red and white, green firetail or maybe a white firetail. The firetails are tipped with bright red at the curly end of the lure. Tail lengths may vary from 2 to 6 inches, with a compromise between the two extremes seen most frequently.

Again, method and technique are everything with these lures. The most often seen retrieve is a steady cranking motion, punctuated with an erratic jig or jerk of the rod tip, to make the lure hop and dance through the water column. There are times, however, when a slow, steady retrieve is the only way to fool the fish. It pays to experiment. Also, watch the guy next to you, especially if he's catching fish and you are merely beating the water to a froth. I can speak from experience on that one.

Last season, on an early fall morning, the trout made a good showing in the surf at daybreak just south of Jennette's Fishing Pier in Nags Head. To my chagrin, I was only an unwilling spectator for much of the bite. An angler only 5 yards to my left was putting me to shame and was hooked up almost constantly, while I was going fishless.

Not that I'm competitive or anything, but it was killing me. After he caught six fish and I

***Jerry Hocutt** hoists a pair of nice puppy drum and a spotted sea trout he caught from the surf at Nags Head. Along the coast, any channel bass or red drum—our state saltwater fish—is called a puppy drum if it's less than about 15 pounds.*

was still blanked, I stopped fishing and started watching. His "retrieve" was a very s-l-o-w crank of the reel handle as soon as the lure settled to the bottom. I mimicked him and immediately started to share in the bonanza.

When the sun was full in the sky and the trout moved off the beach to deeper water, he still ended up with two fish for every one of mine, but at least I didn't get skunked.

Puppy drum are juvenile red drum, easily recognized by one or more dark spots at the base of their tail, and a beautiful copperlike hue over their entire body. These distinctive, identifying marks have earned them the nickname of "spottails," a name that is more common in Florida and Georgia. They are frequently mixed with the speckled trout and can be caught in the same locations.

During the past few years, more sensible fishery management practices for the red drum, such as bag and size limits, have positively impacted this species. The results are encouraging for anglers—strong numbers of red drum in the 2- to 5-pound class.

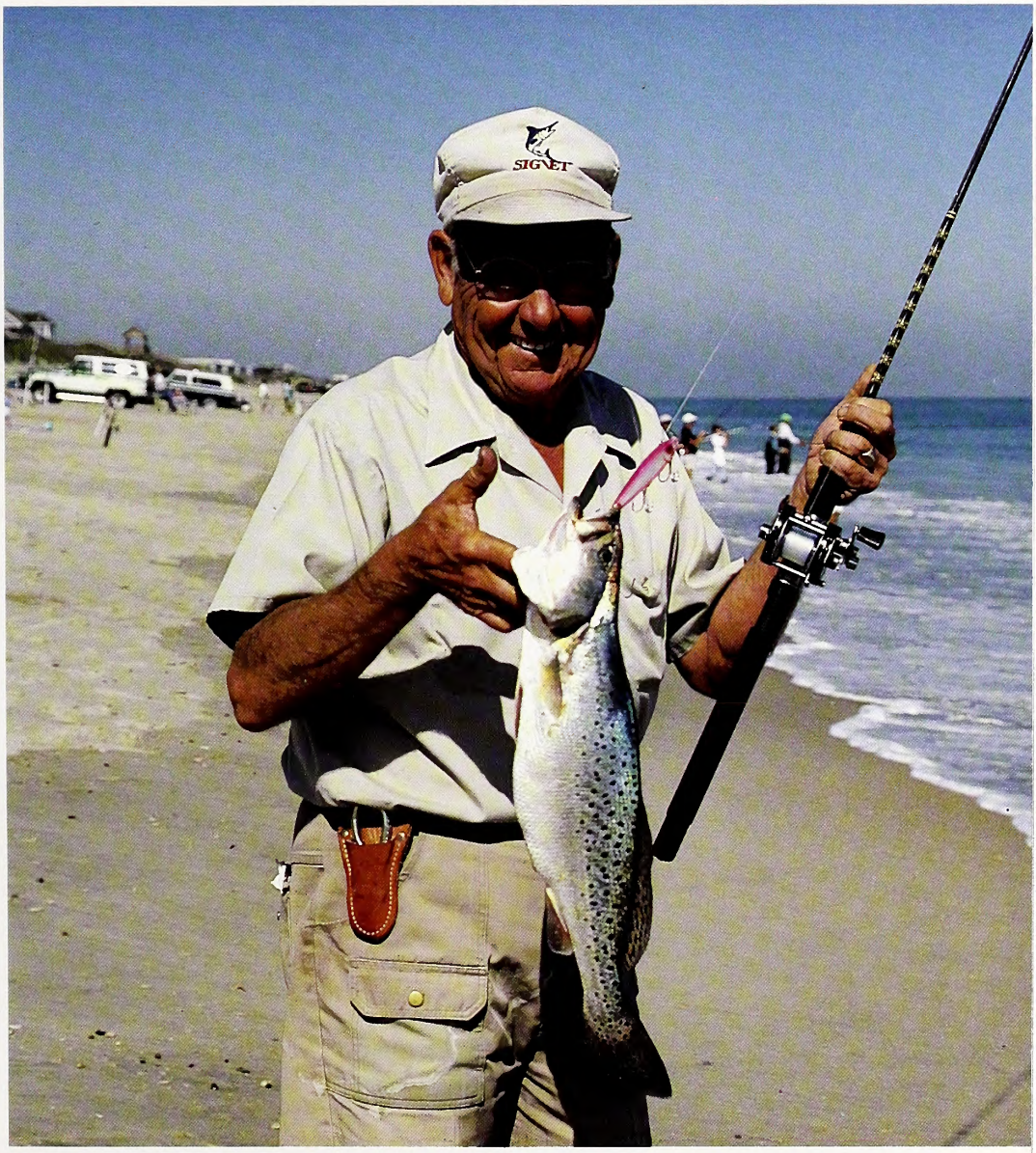
The puppies will go for the identical lures and colors that attract the trout, and the seasonal availability of both species also overlaps. As with most surf-caught species of fish, location is everything and can often be the key to success. Trout and drum, like most other fish, come into the surf to feed. They like to search for food in the deeper pockets of water that pepper the Outer Banks coastline.

They travel the holes and sloughs, pronounced "slews," that are formed between the outer sandbars and the beach. Often these sloughs are narrow, not more than 30 yards wide, but they may be several feet deep.

The best way to locate a "fishy-looking" slough is to go to the beach at low tide and look for places where the beach is steep, and the waves break on the outer sandbar, flatten out and break again on the beach. A featureless, gradually sloping beach, with no significant contours, will be viewed by the observer as a series of short, choppy waves, breaking all the way to the beach. The contours of any beach are always changing, but along the Outer Banks, productive, fish-holding sloughs are frequently formed to the north of many of the fishing piers.

Specks and puppy drum may bite at any stage of the tide. I prefer the end of the falling tide and the first couple hours of the incoming tide. Slack tide, with no moving water, is generally not productive.

Water clarity is also a major player in the formula for success. Clear water is necessary for the fish to see a lure, and a rough surf, with heavy, breaking waves, will make casting difficult if not impossible. The ideal conditions for the fish are also the best for the angler: calm to moderate surf with light winds and clear water.




***Roney Leitner** bagged this handsome spotted sea trout on a MirrOlure while casting in the surf at Nags Head. These fish—locally called specks or speckled trout—are highly prized for their willingness to strike artificial lures. They're also very good to eat.*

However, if the surf is calm enough to fish, most dedicated trout fishers will be on the beach just before first light, no matter what the stage of tide. There are many days when the only action occurs during a brief period of time when the day is just getting under way. A strong second choice would be the period immediately before and after sunset, especially if the trout have made an appearance earlier in the day.

Specks and spottails are perhaps the elite of the inshore fish along North Carolina's Outer Banks. To fool them with small artificial lures and light tackle in the surf is to meet them on an equal footing at the edge of the sea, and share in an experience that is truly unique. The experience is addictive; once you catch them, you have to go back and try again.

I think those who know these fish, and have caught them, will hear what I'm saying and nod slowly in agreement. If you don't know them yet, how can you resist? ⊠

YEAR
OF THE
COAST

# Beaches From Above

## The dynamics of our ever-changing coast create artistic patterns that can best be seen from aloft.

photographed by Conrad H. Lowman ©1994

Even the most grizzled headboat captain, intimately familiar with every inlet and channel along the coast, finds a new perspective from the air. The shifting sands and aquamarine waters, laced with the jigsaw puzzle expanses of emerald salt marsh, take on an abstract quality when viewed from the cabin of a small plane. This abstraction appealed to Wilmington photographer Conrad Lowman during his first aerial assignment along the coast.

"While I had many opportunities to observe and photograph the coastal waters from land and by boat, the same places looked unique and different from the air," he says. "As an artist, I began to record this aerial perspective with my camera. Nature's designs, textures and colors have become the subject matter of my photographs."

While participating in public hearings on Outstanding Resource Water designation for Topsail and Middle sounds—a designation that would direct more protection to these pristine areas—Lowman realized that the abstract shapes that pleased him might also serve an educational and even conservation purpose.

"By sharing these unique angles and documenting the natural changes that take place over time, I hope to increase public awareness of the diversity and vulnerability of our spectacular coastal resources," he says. "I also hope to challenge all citizens of these areas to do more to protect this ecosystem so that future generations will be able to enjoy these waters as we do today."

All of the photographs on the following pages were taken within a mile of each other, near Figure Eight and Hutaff islands. The photo on the left is a wide angle perspective that shows the north end of Figure Eight Island, in the foreground; Hutaff Island across Rich Inlet; and two other inlets to the north—Elmore and Topsail inlets, respectively.

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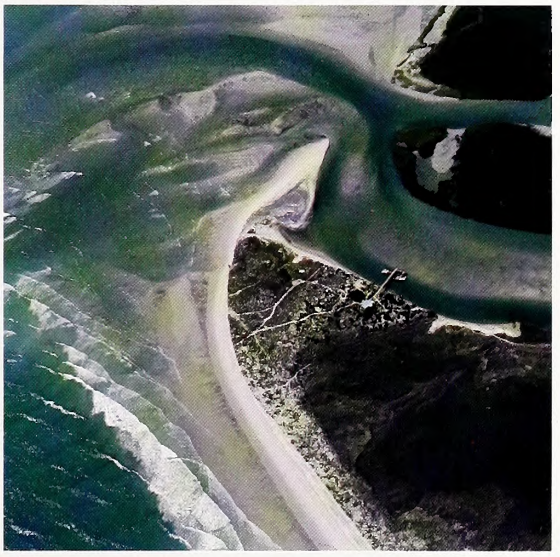
Wildlife in North Carolina *asked coastal experts Ed Brooks and Spencer Rogers to look at Conrad Lowman's photographs and tell us what they saw. Brooks is a coastal field representative for the Division of Coastal Management who works in Wilmington. Rogers, a coastal engineer with UNC Sea Grant, works out of the North Carolina Aquarium at Fort Fisher.*

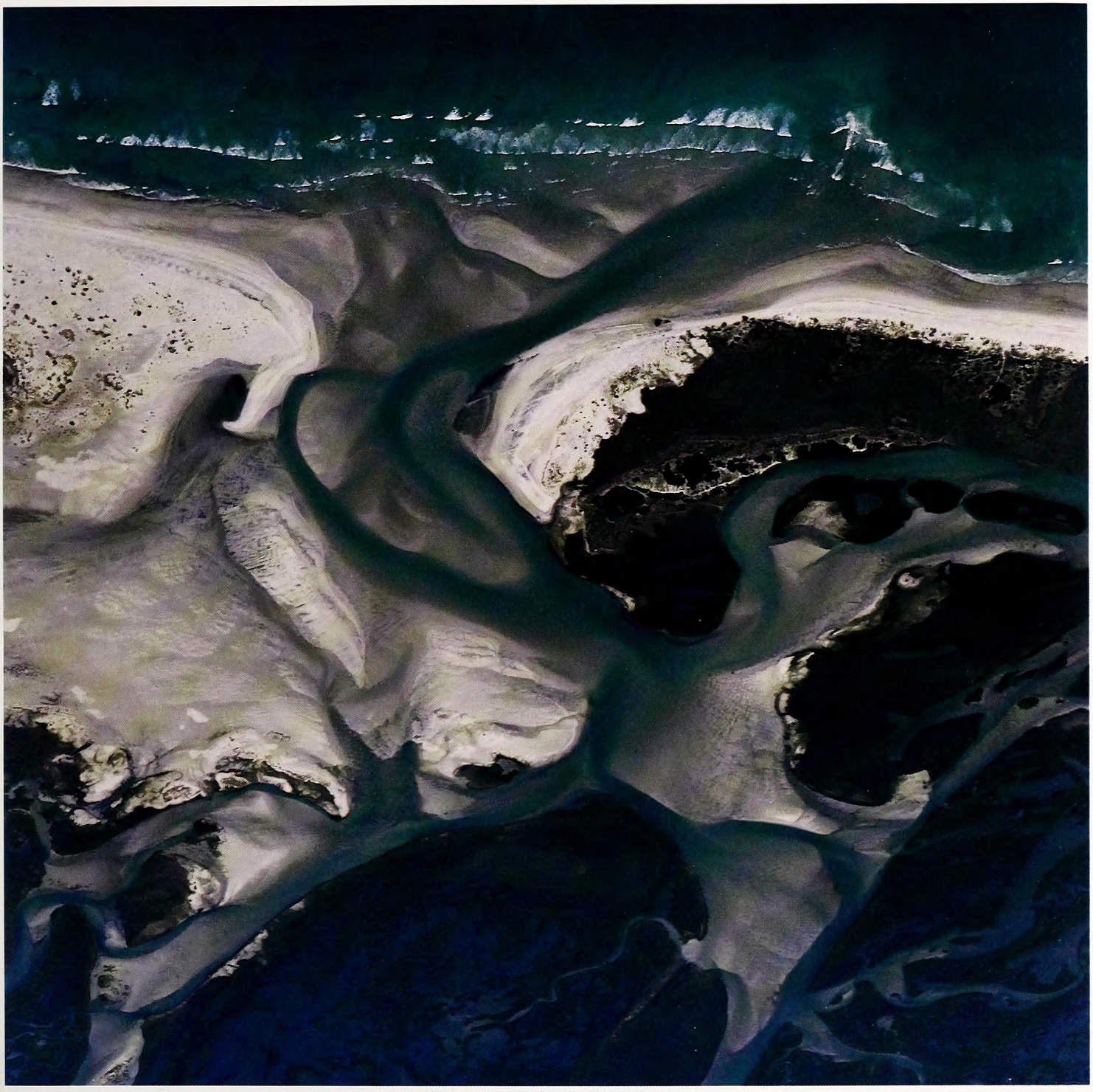


***Rich Inlet (left and top),*** *like other inlets in the state, is a volatile balance of sand, moved by waves along the beach trying to close the inlet while tidal currents, in and out of the sounds, try to blow the opening even wider. The shoals, channels and inlet shorelines are constantly changing. The changes are most apparent during storms and monthly spring tides when larger tides move more water through the inlet. The average rate of inlet shoreline movement in the state over the last 50 years is around 65 feet per year. Inlet movements fall into several categories. Most migrate in one direction, usually pushed south by waves from northeast storms. A few inlets are fairly stable, like the Cape Fear River entrance. Rich Inlet belongs to a group that seems to oscillate around a fixed area. Less than a year before the photo was taken, Hutaff Island to the north extended 1,500 feet farther south. A similar northward movement of 2,000 feet occurred in the 1950s only to be followed by a gradual migration back to the south through the 1980s.*

**Green Channel, located behind** *Rich Inlet, in Middle Sound, threads through an ever-changing system of sandbars and sandy shoals. The recent erosion of Hutaff Island, north of the inlet, has added a lot of sand to this channel, probably contributing to the formation of these sandbars. The sand will be moved by the tides back onto the island or someplace within the system. All this sand affects boating navigation. Boaters need to understand the dynamic characteristics of the channels—a channel open last year may be blocked this year.*

***Looking at maze-like*** *Green Channel from another angle, one can see that the chief characteristic of the estuarine system is its dynamic, ever-changing aspect. Tides play an important role in this system. In southern North Carolina, the distance from the barrier island to the mainland is relatively narrow, and as a result the tidal amplitude can range from 2½ feet to over 4½ feet. That kind of fluctuation can turn over a tremendous volume of water during the tidal cycle, and it is one more force contributing to the unpredictable nature of the coastal zone.*

***The clammer in the*** *low-tide salt marsh is making use of one of the state's great resources. The photograph shows the traditions of fish and shellfish harvesting that we take for granted. It's a tradition based on the contributions of the salt marsh and and mud flats in the picture. They provide the nutrients used by organisms at the bottom of the food chain, which become prey items for other organisms at the next level of the food chain. Without the nutrients contributed by the salt marsh, we would have a poorer resource.*



**This photo of beach,** *inlet, channels and marsh shows the complexity of the estuarine system. Ends of barrier islands adjacent to inlets have been designated as a part of an Ocean Hazard Area of Environmental Concern by the Coastal Resources Commission, and they carry the same types of setback restrictions as the ocean front. Inlets are susceptible not only to storms and wave action, but also to the effects of large volumes of water moving in and out of the estuary through the inlet. All these pictures show the beauty of the coast and also the dynamic and interrelated nature of the system.*

# ENVIRONMENTALIST AT LARGE

## Dr. Tom Quay's legacy to the modern environmental movement can be found among the countless students he taught at N.C. State University.

interview by Lawrence S. Earley and A. Sidney Baynes
photographed by Melissa McGaw

*Few have had as profound an influence on so many as has Tom Quay, retired professor of zoology and wildlife conservation and management at North Carolina State University. Even in retirement he has continued his passion for educating the public about the importance of natural habitats and the conservation of all species.*

*When Professor Quay received his Ph.D. from N.C. State in 1948, he was invited to become a member of the Department of Zoology, where he remained until his retirement 32 years later. Over the years he was to distinguish himself in the field of ornithology by his study of how birds adapted themselves to their habitats. He did important work on the mourning dove and the Canada goose, the ring-necked pheasant and the wood duck. He was one of the first people in North Carolina to look, in some detail, at the population levels of colonial water birds and the ways they used their island habitats.*

*But perhaps even more than his individual scientific studies, Tom Quay's main contribution lies in the countless lives he has influenced as a teacher. During his career, he chaired 53 master's and Ph.D. committees. Those who knew him as a teacher at N.C. State describe him as an extroverted, inspiring teacher who infected them with his own enthusiasm for their studies. Always genuinely interested in his students, both undergraduate and graduate, he could counsel them on their personal lives as easily as he could give career advice. As a result of this gift, many of his students today are doing important work for wildlife in state and federal agencies and in universities and private enterprise across the country. All of them pay heed to Tom Quay in helping them shape their career direction.*

*Tom Quay's dedication to the conservation cause did not end when he retired from N.C. State in 1980. He has served on boards with the Nongame and Endangered Species Advisory Committee, the Sierra Club, the Conservation Council of North Carolina, the Albemarle-Pamlico Estuarine Study, the N.C. Coastal Federation—over a dozen groups in all. He calls himself "a full-time, volunteer, unpaid environmental activist" and has lobbied state agencies and legislators on behalf of a variety of conservation causes.*

Wildlife in North Carolina *interviewed Tom Quay at his Raleigh home not long after he was inducted into the N.C. Wildlife Federation's Conservation Hall of Fame. He had this to say about his life and studies.*

I was born in Mt. Holly, New Jersey, on August 23, 1914. I didn't grow up on a farm, but Mt. Holly was a farming village, a little village of 5,000 people in southern New Jersey. Do you realize that in 1862, when Abe Lincoln signed the Morrill Act creating land grant colleges like North Carolina State University, that 95 percent of all the people in the United States lived on farms? By Earth Day of 1970 there were only 5 percent, and now it's down to less than 3 percent. That's a staggering change with deep consequences and meaning to our life and natural resources. We have a lot of people who don't know or care about the environment because it's not in their consciousness.

Aldo Leopold said way back in the 1930s, in his *Sand County Almanac*, "When you think that water comes from a faucet and milk comes from a bottle, you're in trouble." Think of that. But aren't we in worse trouble now?

I became a bird watcher when I was a sophomore in high school. I had always been in the outdoors. As a kid I used to wander around and work on a farm when I was 6, 7, 8 or 9 years old, shucking corn, picking cherries, stealing watermelons. A bird watcher watches everything. A wildlifer is always alert, like a wild animal, looking at a bird or a fox out there, looking all the time. I remember seeing my first rose-breasted grosbeak nest and my first mourning dove singing. I remember writing it down while I was at a little creek at the edge of town. I heard a doleful sound and looked up and there sitting on a limb was a mourning dove, swelling up and bobbing its head and body, all those glistening, iridescent colors. I thought, "God, that's beautiful."

I told my biology teacher about my experience and she said, "You ought to join the Delaware Valley Ornithological Club in Philadelphia that meets in the Philadelphia Academy of Sciences." This was in 1930. It was a godsend for me. Through that club, I met architects and businessmen and bankers and lawyers and rich young scions of Philadelphia mainline families. The club was a meeting of mostly high class professional people who were bird watchers. New York ornithologists came down to the Philadelphia Academy of Sciences and talked to us. What an august bunch of men! I was with them from 1930 to 1934. We'd go to Cape May every year for field trips, great men in their professional fields. They'd take their Sundays and go bird-watching.

I couldn't go to college right after high school because I didn't have any money. It took me two years to get to college. I picked out the University of Arkansas because it was cheap, and far away, and in the Ozark Mountains. It also had a professor named W. J. Baerg in the School of Agriculture who taught a course in ornithology. On my second day on campus I went to see Professor Baerg. He was a big, severe-looking German man. I told him about the Delaware Valley Ornithological Club. He said, "Well, come on out with me." I went out with him and identified birds. Riding along in his car one day, I said, "Hey look, that's a flock of starlings." He

BIRDS OF NORTH AMERICA

N.C. WILDLIFE RESOURCES COMMISSION

*Wood duck*

said, "What's that?" There hadn't been a starling recorded in Arkansas before that. He was pleased, in his dignified way, and published the note in the *Auk*.

I graded papers for Professor Baerg and began teaching in the zoology laboratory. I had a ball. I was eager, essentially a poor boy who found out it's fun to learn.

I came to North Carolina State in 1938. Z. P. Metcalf was here, a zoologist who had started the wildlife curriculum in 1937. The wildlife program was expanding, so I came in. on the ground floor, thanks to the vision of Metcalf.

Ecology began to mature as a science in the late 1920s. Few people had even heard about it before then. The 1930s was the first blossoming of wildlife conservation and management and we were right in the middle of it. There were a bunch of pioneer ecologists in this area. We had Robert E. Coker over in Chapel Hill, and C. F. Korstian who created Duke's School of Forestry, which was the greatest school of forestry for a long time. B. W. Wells came to State in 1919 and did his great research in the '20s and '30s. Metcalf came in 1912 and was a giant in his field, as was A. S. Pearse at Duke.

B. W. Wells and I became the closest of friends, right up until he died at 94. The man was a tremendous scientist of national capacity who stayed in North Carolina and didn't get nationwide recognition during his time because he was kind of bombastic and believed strongly in what he believed. He was such an individualist. He treated his students as friends and worked with them person to person. I think all great graduate professors do that.

Wells was a great teacher. He was outgoing, enthusiastic, knowledgeable. I remember when I came to N.C. State in 1938-39, I took a field trip in his ecology course down east, a three-day field trip through all these natural communities and ending up in Wilmington. I remember going around White Lake with him when he was 54. He was walking along and his eyes would just snap—he was so alert he vibrated with energy. He was walking up front, people were dragging along behind, and he'd say, "Hey, c'mon, you guys, step it up, keep lively. Keep up with me. I'm getting too old for this, you know. I'm 54."

But he was like that. He took interest in everything, including the body politic. He was an original scientist and had an original inquiring mind.

I joined the navy during World War II, just before they drafted me. I was gone for four years and when I came back to State to finish up it was 1946.

During my whole professional life I worked on birds and other vertebrates in relation to how they fit into the environment. It's an especially critical concept in managing rare and endangered species because so many of them have such restricted habitat requirements. If you don't know their habitat requirements you can't manage them.

Dr. Baerg told me one day, "Birds are habitat bound." That stuck with me all my life and I found out he was right. Bird watchers know that; hunters know that. Hunters and fishermen know that you go where the environmental conditions are favorable to the species.

This is a great principle that explains so much. One of the research projects I worked on early in my career was at Lake Mattamuskeet. This was a triumph of wildlife management over inappropriate agriculture. In the teens and '20s, entrepreneurs bought up a vast amount of land down there—the lake bed and its borders—and tried to make it into a farm. They put in a pumping station and tried to pump out the water. They found that they had to keep pumping to grow these big fields of row crops—corn and soybeans. But when the rains came the heavy machinery sank into the ground and the project turned out to be a failure. They didn't pay any attention to the fact that Lake Mattamuskeet was only 6 miles from Pamlico Sound, and the soil was sandy and peaty. The water kept seeping in, the lake bottom being below sea level.

So the U.S. Fish and Wildlife Service bought it cheaply in 1932 and made it a gem of management. They controlled water levels and managed vegetation so that it became a waterfowl paradise for Canada geese and ducks. It became the center of Canada goose hunting in the world.

But then science came along with new developments in agriculture, in genetics and plant breeding. Two things happened that the Fish and Wildlife Service couldn't control. One was that crop breeders developed corn that would mature and dry out more quickly and farmers cleaned out the fields. By the time the geese came from the north in the full moons of October and November—150,000 Canada geese, 200,000 ducks of all species—they couldn't find enough food. The other thing that happened was that the Delmarva peninsula region began to grow truck crops nearer to the big cities. As a result of these two things the geese adopted the habit of "short-stopping." They didn't come this far south any longer. They used to go all the way to South Carolina and Florida, all the way to St. Marks refuge, but they short-stopped.

Which demonstrated something of a great natural experiment—the geese could stand the colder weather in winter if they had food. Now they are short-stopping still farther north.

It always struck me as extraordinarily interesting that birds and animals can shift from one geographic area to another if the food and habitat were okay.

Plants and animals usually need three or four things that they can't do without, no matter what else is there. It might be something like the presence of potassium or nitrogen in the soil. It's that way with the ring-necked pheasant, a northern bird whose original range was south only to the glacial line, across the middle of New Jersey and Ohio, where there's lots of calcium in the soil and where it's cooler. It was introduced to the Outer Banks of North Carolina and began reproducing. We studied it for many years and found that it survived for several reasons. It's cool out there, no matter which way the wind blows. The sand may be hot under the sun, but it's cool and it's kind of moist out there with places to hide. And the soil has seashells in it so it's got calcium, and there were no foxes, at first. The bird only needs to have a few things to make everything just right.

I worked on a lot of game birds, but each time it was because of the relation of the bird to its habitat. For example, we did some extensive research on mourning doves from the late 1930s into the 1950s. When we began that research, the dove-hunting season in North Carolina began about October 15. It was a fall season. Biologists had the idea that doves were still singing and nesting into August and September. They'd say, "Boy, we

can't shoot any birds while they're still nesting." Well, for one thing, the nesting birds are a very small part of the population, and they were not generally accessible to the gun. The adult mourning dove incubates 12 or 14 days and then she has the young in the nest for another week or two. Once they leave the nest she tends them for several more weeks. They aren't out flying in the fields during this time; they stay put. So the small population that is nesting is rarely accessible to the gun.

We knew by then through trapping and banding and counting that almost all the birds that were raised locally moved on south soon after taking wing to South Carolina, Georgia, Florida and Mississippi. We had found out that the major fall migration of mourning doves from the north is in the last week of August and the first week in September. Hunters there had a long winter season. They were shooting the birds that we could have shot.

So Clyde Patton, the director of the Wildlife Commission then, looked at that data and said, "Why let them all go South and let someone else shoot them. We'll move the season back and begin on Oct. 1." And each year he moved it up, about a week at a time. We moved that season up about six weeks earlier and increased the dove take tremendously. It didn't hurt the dove populations any. We had all this edge habitat that we had opened up, and the doves were breeding like mad.

N.C. WILDLIFE RESOURCES COMMISSION

*Piping plover*

This shows the advantage of scientific investigation. We counted and banded and retrapped and put it all together and did mortality tables for the whole Southeast.

In 1957, I was asked by the National Park Service to catalog the natural features—plant and animal life—of Cape Hatteras. The Park Service had just established the Cape Hatteras National Seashore. I studied all 18 natural communities, from the bare sand, ocean and surf to the maritime forest. I detailed the species of plants and animals all through the vertebrate series and gave them a complete ecological and environmental story.

I liked the coast. In fact, I had published my first paper in 1942 on colonial nesting water birds—the pelicans, herons, gulls and terns. But I didn't understand it, I didn't catch on. It took students of mine, Jim Parnell and Bob Soots, mainly, in the late 1960s and 1970s to establish the relationship between what the Corps of Engineers was doing with its dredging and these water birds.

What a fortuitous event! The corps had dredged the waterways and the inlets of eastern North Carolina and dumped the sand nearby, often right on salt marsh. This was in the years before the great ecologist Eugene Odum and others found out that the salt marsh was a rich ecosystem and that you should preserve it, not bury it. Originally, the birds nested on the beaches but they lost their place when people began to come and beach buggies began riding up and down. But through the biological work of Parnell, Soots and others we discovered that the birds were using these islands to nest, and that the islands were helping to bring back the populations.

I have to mention too the great work of another of my students at State, Gene Hester. He demonstrated in the 1950s that you could increase the wood duck population tremendously by putting nest boxes up for them. Wood ducks back then were almost rare and endangered; there was no hunting season for them, or perhaps only a reduced season. We just didn't have many wood ducks in the southeastern United States. Hester demonstrated that the two habitat factors they needed were a nesting area (the nesting box) and rearing habitat for the young nestlings during the first two weeks. Eventually he went on to write a book on it. He became in the 1960s *the* managerial expert on the biology, management and population growth of the wood ducks.

In North Carolina, the thing that worries me most is the rapid loss and degradation of our environment. We cannot survive without the natural systems. That's what all environmental groups are giving themselves to. They all know that everything else will fail unless we preserve habitat. We need to do it quickly and soon. So the biggest struggle is with the people who don't seem to understand this and work against it. I think education must be the single biggest answer to our environmental problems.

There have been some tremendous victories over the past decade that give me hope for the future. I suppose it's in the coastal habitats where the most dramatic victories have been. I'm happy about the victories in the coastal zone, where so much of our habitat, wildlife, wetlands, water and water problems are. I think it was great that we purchased the Alligator River National Wildlife Refuge and the new Pocosin Lakes refuge. And the Roanoke River National Wildlife Refuge. What a long, bitter 5- or 6-year fight! The Roanoke River bottomland is the best stand of southern hardwood wetland forest in the southeastern United States. It would have been a terrible thing to have lost it.

N.C. WILDLIFE RESOURCES COMMISSION

*American egret with young*

I suppose we never know how we came to be who and what we are, but I think it's important to figure out who you are and adjust to that. I ask people, "You know what's the best age to be?" I say, the age that you are, because you have to adjust to that and if you can't you're in trouble. I fight that every day, especially since having a heart attack. Every day becomes sweeter.

It's always been hard for me to give up something I started. Right now it's the hardest thing in the world for me to tie ribbons around projects I won't get to finish. It's hard to give up old hats, old friends, old cars, old shoes and old research projects. It's hard to do. ☐

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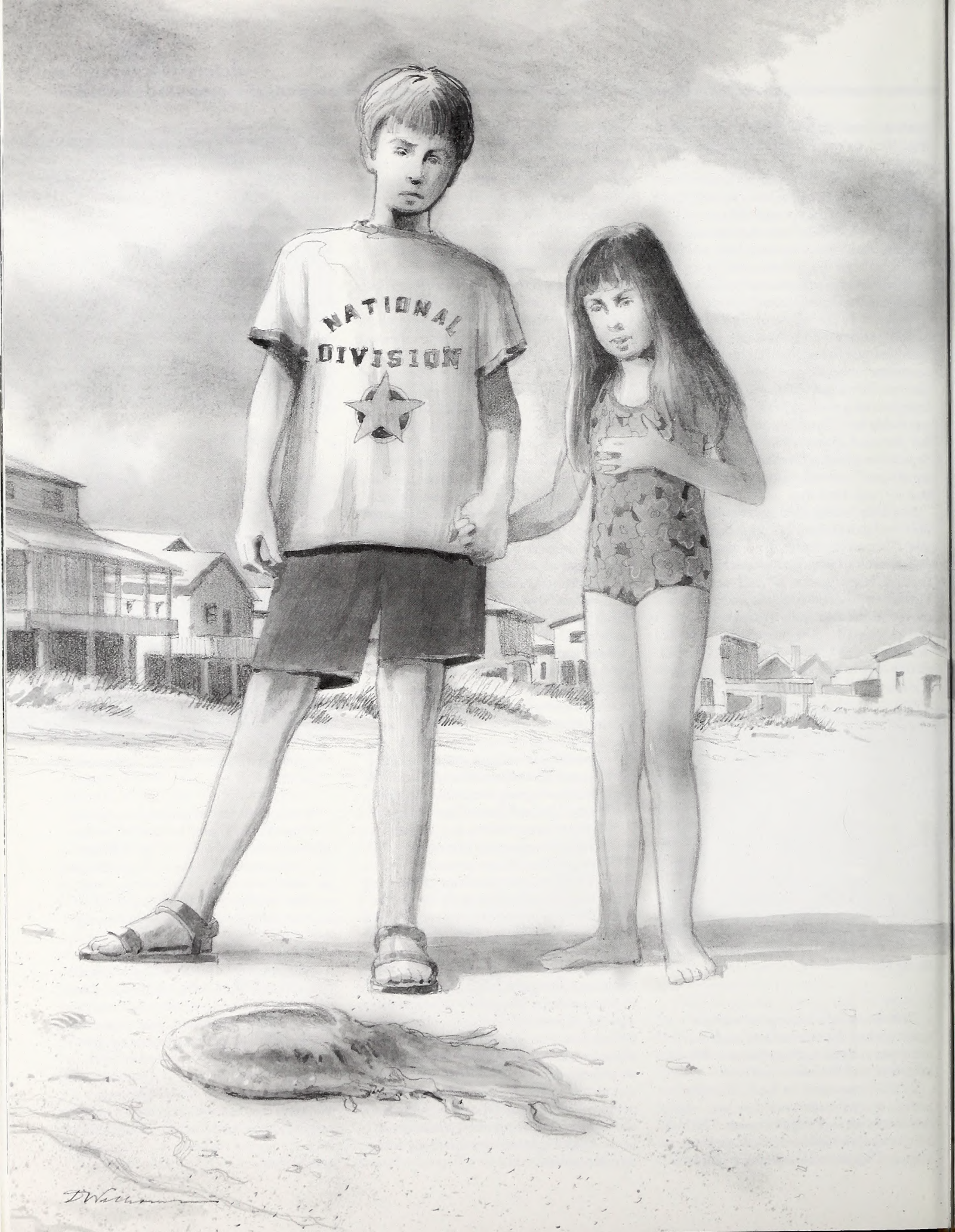
*"Carolina Profiles" is a periodic feature in* Wildlife in North Carolina. *In these interviews, men and women reflect on their outdoor experiences and on what the land and its resources mean to them.*


NATIONAL
DIVISION

# Just When You Thought It Was Safe . . .

Not to scare you away from the beach, but there are a few marine hazards you ought to know more about.

written by Peter K. and Catherine E. Meyer ©1994
illustrated by David Williams ©1994

Aaah, the simple pleasures of a summer vacation at the beach. Rolling waves break in the surf, providing a soothing lullaby for sleep. Morning breezes bring landward the fresh smell of sea air. Raucous cries of sea gulls pierce the air as the birds fight over tasty bits of flotsam washed in by the sea.

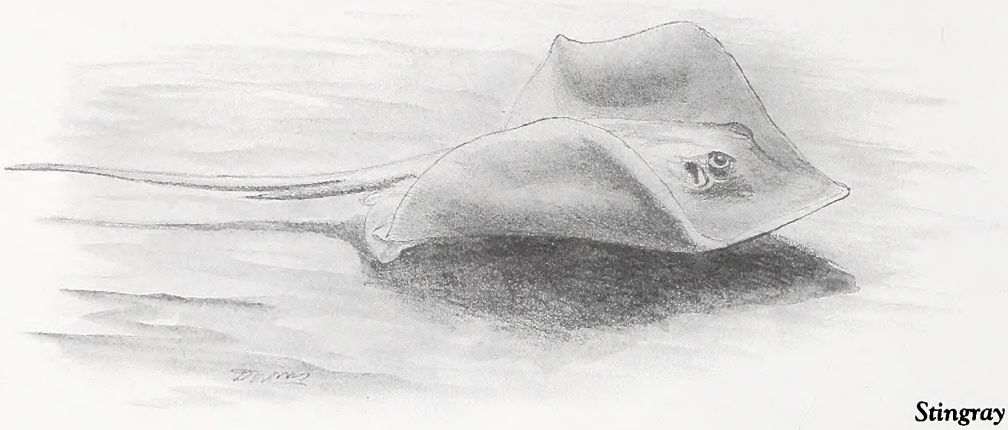
The sun rises higher, causing the ocean to shimmer like a giant bed of diamonds. Slowly, the day heats up, the air and sand solar-microwaved.

Cottage doors slam as people scurry to answer the call of the beckoning beach. Warm sand between the toes soothes feet too often confined in shoes. Beach towels unfurl and float gently to the sand. Relaxation and human beach renourishment begin in earnest.

When bare skin glows with sweat, the blue-green water and laughter of frolickers-in-the-surf pull like a magnet, promising cool relief from the heat.

***Low tide often** strands jellyfish on many of North Carolina's summer beaches. The stings of jellyfish are mildly painful, but those of the Portuguese man-of-war may cause shock and even, rarely, death. Swimmers should avoid all floating jelly-like masses even after they are beached. The stinging nematocysts of men-of-war are potent for months.*

# Just When You Thought It Was Safe . . .



*Stingray*

You may be looking forward to a refreshing dip in the surf, but then you wonder: Are creatures lurking beneath the waves, waiting for innocent tourists to squeeze or sting? Are giant sharks combing the shallows, seeking to swallow unsuspecting swimmers?

The haunting images of movies such as *Jaws*, with an enormous shark displaying huge, vise-like jaws full of ivory teeth, have made more than one person wary of entering the water.

In reality, the oceans are not filled with creatures waiting to prey on man. The sea along the Carolina coast is, in fact, host to relatively few animals dangerous to humans and encounters with these creatures are largely accidental. As with snakes and stinging insects on land, we need to know which marine creatures can cause harm, how to avoid them and how to treat an injury should one occur.

**Sharks and Other Biting Fish**

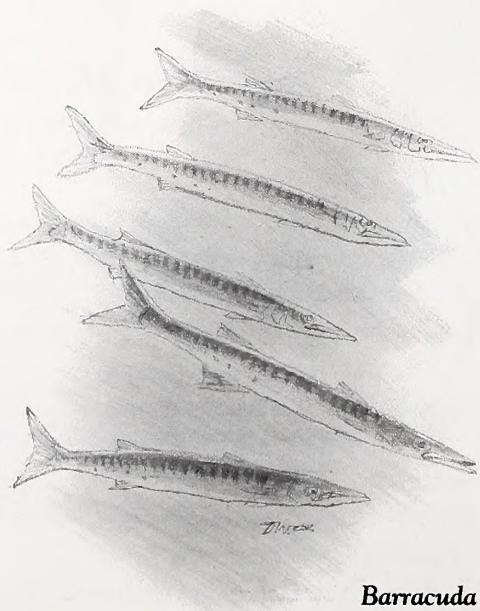
At the top of the list of fish that bite are sharks, the most feared residents of the ocean. Sharks have been swimming in the oceans since dinosaurs roamed the earth. From the time modern-day (1900 to 1994) records have been kept, however, only 10 confirmed shark attacks have been reported in North Carolina waters; four attacks were fatal.

We shouldn't go around terrified of man-eating sharks. On average, three people die every year in the U.S. from shark attacks while 45,000 perish annually in car accidents. Statistics reveal that in comparison with shark attacks, a person is five times more likely to die from a dog attack, 30 times more likely to die from a falling piece of airplane, and 400 times more likely to die from falling on stairs.

To avoid shark attacks, don't dress to resemble a seal. That may sound ridiculous but seals are the natural prey of sharks and everything that looks like one, or that even has the same shape, may be vulnerable to attack. Stay out of the water if you're bleeding. Swim in groups and during the day—sharks tend to attack lone swimmers and mostly feed at dusk or night.

Other strong-jawed fish are present in Carolina waters. Barracuda are commonly encountered on scuba expeditions. These fierce-looking fish are actually "big babies," not at all prone to attack. Reports of attacks in other parts of the world typically occur in murky water and involve barracuda mistakenly attacking a shiny object. Participants in water sports should not wear shiny jewelry or buckles that barracuda might visualize as the glint of small prey fish.

Moray eels also have a fearsome appearance and a reputation worse than their behavior warrants. These fish tend to be reclusive, hiding in rocky lairs by day and feeding at night. Morays bite only if provoked, as when an unwary scuba diver sticks a hand into their hiding place. Morays tend to clamp and lock, rather than strike and release; these fish can be quite difficult to remove once they take hold.



*Barracuda*

Bluefish are well known for their gluttony in the surf, attacking baitfish in feeding frenzies. When feeding, blues slash at anything in the water—including people in the surf. If the water is boiling with fish activity, indicating a school of fish feeding, stay out of the water.

Bluefish, mackerel, marlin, wahoo, sharks and other game fish can bite or slash when landed as well. Care should be taken handling these fish fresh out of the water—they may be quite "live" and still inflict serious injury.

In the event of a bite inflicted by a shark or other fish, the first thing to do is stop the bleeding. Direct pressure alone controls bleeding from most wounds. Place a clean piece of gauze or cloth over the wound and apply firm pressure with a hand. For larger wounds (with brisk arterial bleeding), compress an artery in the groin or elbow, or apply a tight tourniquet above the wound. Seek immediate care for any bite wound at an emergency facility.

**Stingrays and Venomous-Spined Fish**

With bodies flattened like a pancake and pectoral fins spreading from their sides into "wings," stingrays glide gracefully yet eerily through the water. Much of the time, though, rays lie half buried and motionless on the bottom, waiting for prey. In this unmoving, stalking state, rays can present a hazard to people as well.

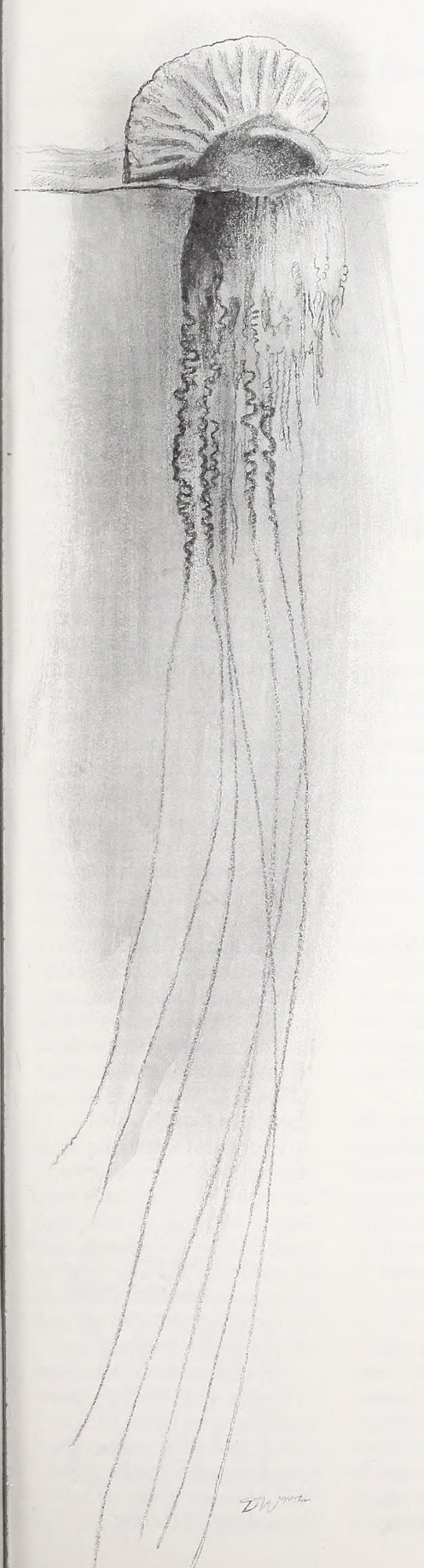
A swimmer or wader, unaware a stingray is buried close by, may step on the ray causing it to flail its tail back and forth. A barb at the base of the ray's tail may penetrate the person's foot or leg, and venom in the barb's groove is injected. Part of the barb may actually break off in the wound.

Intense pain results from the puncture wound or cut; the pain peaks in about 1½ hours and can last up to two days if not treated. In addition to pain from the wound, other symptoms include sweating, nausea, vomiting and fainting.

Fortunately, you can treat a stingray wound fairly simply: Immerse the area stung in hot water. The water should be as hot as the victim can tolerate without scalding. Immersion should continue for 30 to 60 minutes. This effective means of treatment neutralizes the venom (the toxin is a protein that is broken down by heat) and alleviates the pain. Hot water also helps minimize tissue damage and the possibility of infection.

If the person who is stung suffers symptoms involving the entire body, or a piece of the

*Portuguese man-of-war*



barb is thought to be in the wound, or hot water fails to control the pain, seek treatment at an emergency facility.

While a stingray may inflict a painful wound, the toxin is not potent enough to kill a person. Fatalities in other parts of the world have resulted from freak accidents when a large ray's barb penetrated the chest or abdomen, damaging the victim's heart or internal organs.

Stingray injuries are uncommon, even though several species of rays frequent Carolina waters. Closely related skates have similar shapes but lack a barb on their tail and are harmless. Oyster toadfish, spiny dogfish shark and catfish are other marine species that possess venomous spines. Injury from these fish, though milder, is similar to that of a stingray and is treated in the same manner—immersion of the affected area in hot water.

Prevention of stingray and other spiny-fish injuries is the best treatment of all. If waders shuffle their feet as they walk in murky water, a ray will flutter off to safety. In addition, anglers should take care in removing stingrays or other spiny species from hook or net.

**Jellyfish and Kin**

Many species of jellyfish inhabit Carolina waters. Some are harmless. Some, like sea nettles, are potentially harmful, causing mildly painful stings.

More problematic are clashes with Portuguese men-of-war. Sporting a buoyant, translucent blue, gas-filled chamber, with tentacles extending perhaps 90 feet below, men-of-war are actually colonies of individuals, not true jellyfish.

Each tentacle of a man-of-war contains as many as 750,000 tiny stinging cells called nematocysts. Contact with the tentacles causes nematocysts to fire a miniature barbed dart containing toxin. A tentacle brushing against an arm or leg results in multiple stings and painful, linear, welt-like lesions of the skin ensue.

Like stingray wounds, man-of-war stings produce intense pain. Symptoms such as nausea, vomiting, sweating and dizziness sometimes occur. Fatalities are very rare, although, as with any sting, potential for anaphylaxis (allergic shock) exists.

You can treat jellyfish or man-of-war stings by applying vinegar soaks to them. Cover the stung area with a towel or shirt, saturate the cloth with vinegar and leave it in place for 30 to 60 minutes. Vinegar is the solution that best inactivates nematocyst toxin.

After neutralizing the toxin, tentacle parts can be removed. Shave the area with a razor blade and shaving cream, or as an alternative, apply a sand paste and scrape the area with a sharp shell or piece of wood. Apply hydrocortisone cream to the area and take over-the-counter pain medicine if burning persists. If the pain is incapacitating, or an allergic reaction, shock or other symptoms involving the whole body appear, seek medical care immediately.

To prevent man-of-war stings, give wide berth to colonies in the water. Keep away from beached specimens, too: Nematocysts may remain active for months after a man-of-war washes up on the beach.

**Marine-Acquired Wounds**

Wounds can ensue from contact with many different marine animals or objects. You may step on an oyster shell or sea urchin, puncture yourself while cleaning fish or shrimp, or cut your hand while opening shellfish.

Contrary to widely held belief, salt water is *not* a sterile, germ-free medium. Bacteria are present, but the species are different from land types. Over 20 marine species are known to cause disease in humans.

Marine-acquired wounds are, in fact, somewhat prone to infection. Infection is more likely for at least three reasons: 1) Wounds are often contaminated with grit and foreign material of any type increases chances of infection. 2) Sting wounds can cause loss of blood supply and tissue death at the injured site; sometimes, spines break off in wounds. 3) Any type of bite wound, whether from land or marine animal, is heavily contaminated with mouth germs.

If an infection develops from marine contact, a doctor treating the infection should know that the wound is marine acquired: Specific antibiotics are required to kill marine bacteria (standard antibiotics used in land-acquired injuries may not work).

As with any wound, a tetanus shot is recommended within 72 hours if the injured person has not had a booster shot in the past 10 years.

Immune-suppressed persons (patients with liver disease, alcoholism, diabetes, AIDS, chemotherapy or steroid treatment) should be especially careful after receiving cuts in the marine environment. Local wound infection with a germ called *Vibrio vulnificus* can spread rapidly through the whole body and cause death within one to two days.

In general, however, encounters with hazardous marine animals on the Carolina coast are few in number, not serious and treatable with simple remedies. Common sense will go a long way in avoiding potential hazards, such as jellyfish and men-of-war.

So, go, enjoy the sunny days along our sandy beaches. Embrace the fresh sea air, breaking waves and foot-soothing sand. Lie or play, allowing the radiant sun to renourish your soul. Seek remedy from the heat with a refreshing dip in the aquamarine sea.

And as you are enjoying the salty brine, know that you are far safer there than riding in your car. ☒

*Reasons for Decline Not Understood*

# Colorful Coral Snake Disappearing from North Carolina

*Written and Edited by Vic Venters*

Since the 1960s, the eastern coral snake has become increasingly rare in North Carolina, and it may be disappearing altogether from the state.

The southeastern Coastal Plain of North Carolina is the northernmost range for the highly venomous coral snake, which is found along the Atlantic seaboard in South Carolina, Georgia and Florida. Always uncommon in the state, it has apparently disappeared from favored habitat in the Sandhills region, and most of the last reliable sightings have been in New Hanover and Brunswick counties.

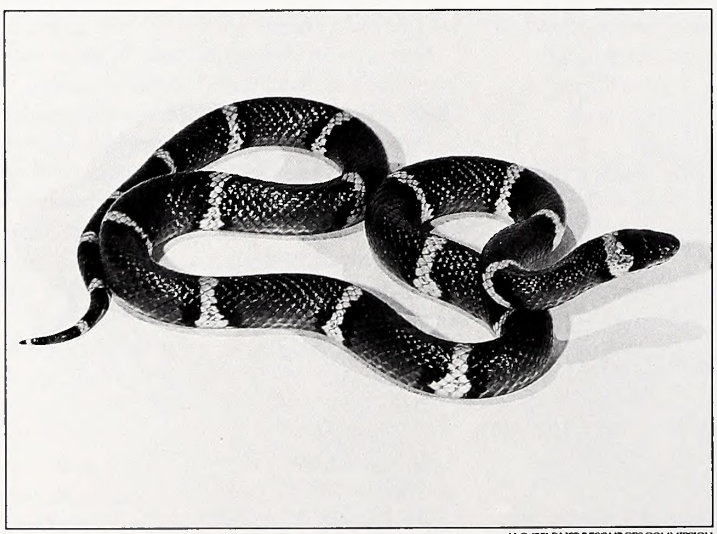
"About 40 years ago the coral snake was occasionally encountered in the Sandhills and as late as 15 years ago we would hear of one or two confirmed sightings each year in the state," said Alvin Braswell, a curator of herpetology at the N.C. Museum of Natural Sciences. "However, the last specimen from North Carolina dates to 1984 and we've had very few reports since then. The last unconfirmed sighting was near the town of Atkinson in Pender County about three years ago."

Coral snake habitat has traditionally consisted of Coastal Plain sandy flatwoods, maritime forests and Sandhills forests of pines, scrub oaks and wire grass. The reason for the apparent decline is largely unknown. Increasing development in the snakes's last stronghold in New Hanover County and persecution by humans may be part of the reason, Braswell said, but the snake has also disappeared from prime habitat in areas like the Sandhills Game Land and Fort Bragg military reservation. "It's a puzzle," added Braswell, "but it may be linked to the general decline we're seeing in reptiles and amphibians."

The coral snake is often confused with the scarlet king snake, which, to the casual observer, has a similar coloration pattern. However, the coral snake has a black nose, with its red bands touching yellow bands. The harmless scarlet king snake has a red nose, with its black bands touching red bands.

N.C. WILDLIFE RESOURCES COMMISSION

***The venomous eastern** coral snake (above) appears to be disappearing from southeastern North Carolina, even from remaining areas of good habitat. Confirmed sightings have almost ceased, say herpetologists at the N.C. Museum of Natural Sciences.*



N.C. WILDLIFE RESOURCES COMMISSION

***The harmless scarlet** king snake (above) is often confused with the coral snake. However, the scarlet king snake can be distinguished by its different color scheme. Coral snakes have a black nose with bands of red and yellow touching. Scarlet king snakes, on the other hand, have a red nose with black and red bands touching.*

Coral snakes are secretive and shy and were rarely seen, even in the past. They spend most of their time burrowed under sand and ground litter, surfacing to hunt for food in late afternoon and early morning.

Their prey consists largely of small reptiles such as lizards and other small snakes. Most snakes were encountered by humans in the mid-morning hours as the snakes hunted for prey on the surface. The coral snake typically ranges from 20 to 35 inches in length.

The coral snake is the only venomous snake in North Carolina that lays eggs. (See Nature's Ways this issue for more information on this topic.)

Although coral snakes are considered nonaggressive, their venom is highly toxic and the reptile should not ever be handled, molested or approached. The snake is also protected by state regulations. "If encountered, coral snakes should not be killed unless they are threatening human life," said Braswell. "Since they are non-aggressive this would be unlikely. We don't know of any confirmed bites by coral snakes in North Carolina and the only bites I've heard about nationally have been the result of someone handling the snake."

The N.C. Museum of Natural Sciences in Raleigh would be very interested in learning about any confirmed sighting of the rare reptile. If you see what you suspect is a live coral snake, keep a safe distance but carefully note the coloration and color sequence of bands on the snake. Also note the location, type of habitat and time of day you saw the snake.

The museum is also interested in hearing about dead specimens that may be encountered. For more information, contact the herpetology department of the N.C. Museum of Natural Sciences at (919) 733-7450.

*Scheduled for September 7-9*

## Coastal Management Conference Planned for Wilmington

Strategies that will influence the future of North Carolina's coastal resources will be discussed at a national policy conference in Wilmington in early September.

The conference, titled "Innovations in Coastal Management," will be held at the Wilmington Hilton on September 7-9. The conference will be attended by Gov. James B. Hunt, national coastal management experts, elected and appointed officials, citizens and representatives of business and industry, as well as government officials and scientists.

Gov. James B. Hunt designated 1994 as "The Year of the Coast" and, by executive order, created the N.C. Coastal Futures Committee, a 15-member panel whose task has been to evaluate current management programs and recommend changes where needed. The Committee's staff have been identifying innovative examples of effective coastal management strategies, and their findings will be presented this year.

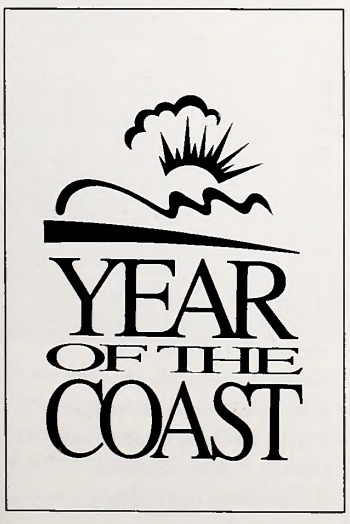
Conference themes will include quality growth management, coastal water quality protection, compatible economic development, environmental education, the protection of the state's natural heritage, protection of public trust rights and improving existing programs.

During the 1980s, the population at North Carolina's coastal zone grew at almost twice the rate of the entire state, putting increasing pressure on the region's fragile estuaries, barrier islands, marshes and maritime forests. The Coastal Futures Committee was charged with identifying the major management issues affecting the coastal region and developing a set of recommendations that will be presented to Governor Hunt.

"This conference will provide an opportunity for a broad national audience to focus on innovations in coastal management," state the conference organizers. "The goal is to increase our knowledge of ways to achieve coastal resources protection in the face of rapid coastal growth and economic development."

Conference funding was provided by the National Fish and Wildlife Foundation, NationsBank, the National Oceanic and Atmospheric Administration and the U.S. Environmental Protection Agency.

Registration for the conference will be $85. For more information, write Innovations in Coastal Management Conference, c/o Jordan McColl, Inc., P.O. Box 3415, Wilmington, N.C. 28406, or call the Year of the Coast at 1-800-232-6210.




*Two New Programs Launched*

## Disabled Sportsmen Offered Special Access, Hunts

Disabled and specially challenged sportspeople will find some North Carolina game lands more accessible in the coming season.

The N.C. Wildlife Resources Commission has developed two programs designed to benefit people with disabilities. The first—the Disabled Access Program—will allow greater road access to selected game lands, while the Disabled Sportsman's Program will provide special either-sex deer hunts to disabled sportspeople who meet qualifications.

The Disabled Access Program will provide increased road access to certain game lands that are suitable for vehicular traffic. Many roads on game lands that have been closed to all vehicular traffic will now be open to people participating in the program.

A car or other vehicle carrying the disabled sportsperson will be allowed special access to some roads. However, off-road-vehicle use in these special areas will still be prohibited in order to protect wildlife habitat and sensitive natural areas. All game lands will not be open to the Disabled Access Program, since many of the tracts enrolled as game lands are not owned by the state and control of road access is left to the individual landowners, not the Wildlife Commission. Many game lands, for instance, are owned by private companies, individuals and the federal government.

A list of game lands included in the Disabled Access Program will be available from the Wildlife Commission before the start of the hunting season. Participation in this program is limited to those persons with restricted mobility. To participate, disabled sportsmen will need a personal permit and a vehicle permit.

The second program, titled the Disabled Sportsman's Program, provides special hunting opportunities for persons with disabilities by setting aside dates during which only participants in the program and their companion may participate in an either-sex deer hunt on certain game lands. Special vehicular access is also allowed on some areas during these hunts. As mandated by the N.C. General Assembly, requirements to participate in this program are very specific as to qualifying disabilities.

There is a $10 annual processing and administration fee for the Disabled Sportsman's Program. Disabilities must be permanent and include: amputation of one or more limbs; paralysis of one or more limbs; dysfunction of one or more limbs rendering the person unable to perform the task of grasping and lifting with the hands and arms or unable to walk without mechanical assistance other than a cane; disease, injury or defect confining the person to a wheelchair, a walker or crutches; legal deafness. (Legal deafness qualifies a person only for hunts, not special access.)

Enrollment in both of these programs may continue as long as the qualifying disability remains. Participants should remember that all normal rules and regulations concerning license requirements, bag limits and manner of take apply to these hunts. For further information or an application for either program, contact the License Section, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, NC 27604-1188.

*New Units Lighter, Better for Fish*

## TU Chapter Builds, Donates Trout-Stocking Tanks to Commission

What weighs about 45 pounds, is uncomfortable to wear and is difficult to carry up a mountain trail? The N.C. Wildlife Resources Commission's old metal fish-stocking units, for one. But thanks to the engineering efforts of the Watauga Chapter of Trout Unlimited, Wildlife Commission fisheries biologists now have a plastic unit that will allow them to move trout farther and to more inaccessible locations.

In the past, the Wildlife Commission has used cumbersome metal containers in its half-wild trout-stocking efforts. Half-wild brown trout fingerlings are typically used to stock streams where food supplies and habitat for survival are good, but where breeding habitat may be limited. Many of these streams are in remote, inaccessible locations—the Linville River in Linville Gorge being a prime example.

Up to now, the Commission's fish carriers were awkward and uncomfortable to carry, and not at all stable. As a result, the distance that they could be comfortably carried and the severity of trail that could be safely negotiated were limited. Also, the old can's metal construction presented a potential safety hazard in the event of a fall.

"The old metal containers—many of them converted from old firefighting equipment—were heavy, had poor straps and lacked aerators," explained Mallory Martin, fish production coordinator for the Wildlife Commission. "We often had to anesthetize the fish before traveling with them any distance. Consequently, fingerling survival was not always good after a long hike and our ability to travel long distances was limited."

In the past, volunteers at the Watauga TU Chapter had assisted in stocking efforts, providing manpower to hike in the units to streams. When chapter volunteers asked Martin how they could be of further help, he replied that new trout-stocking units would be of great assistance.

Chapter volunteers sat down with Martin and formulated a new design. Martin and chapter volunteers put a lot of thought into correcting the readily apparent shortcomings of the existing tanks. With the help of local businesses, the chapter built and donated five units to the Commission.

The new fish carriers are constructed from plastic four-gallon Jacto chemical spray tanks, which had their internal tubes removed to decrease weight and to make them suitable for transporting fish. The tanks were then attached to specially modified Camp Trails backpack frames complete with hip belt suspension systems attached. Also, pads of closed cell neoprene were installed between the tank and frame to insulate the water from the wearer's body heat and also to further cushion the load. To complete the rigs, small battery-powered aquarium aerators were attached to oxygenate the water while on the trail.

KEVIN HARTLEY

***Volunteers at the** Watauga Chapter of Trout Unlimited recently designed, constructed and donated portable fish-stocking backpack units to the Wildlife Commission. The portable units are used to transport half-wild brown trout for stocking in some remote streams that are inaccessible by road.*

For added versatility, the tanks are mounted with a quick disconnect system so that they may be easily removed. This will facilitate cleaning and component replacement and allow the frames to be used separately for other needs.

The new backpacks offer several advantages over the older models. "The new fish carriers have already helped our ability to properly disperse fingerlings along a selected stream," Martin said. "On one recent stocking trip we used both the new carrier and old carrier. With the new plastic units the water stays colder and fresher for a longer period of time. When we arrived at our destination, mortality among the fingerlings was significantly higher in the metal tanks than in the new backpacks."

Each year the Wildlife Commission stocks about 35,000 half-wild fingerlings in various streams throughout the mountain region. Half-wild brown trout fingerlings have been shown to have significantly higher survival rates than pure hatchery strain trout, particularly when they are properly dispersed along good habitat in a stream. Surviving half-wild browns can eventually grow to provide quality fishing and enhance or maintain fisheries that might not otherwise exist.

*—Kevin Hartley*
*Watauga Chapter*
*Trout Unlimited, Boone*

## Omission Noted

The June Nature's Ways, "The Dune Makers," neglected to credit the illustrations of Jeannie W. Kraus published in *A Guide to Ocean Dune Plants Common to North Carolina* (UNC Sea Grant, $4.50).

*Clips Line With Third Shot*

## Enforcement Officer Shoots Osprey Free

In mid-April, the N.C. Wildlife Resources Commission received an unusual call for assistance to help a trapped bird at Jordan Lake. An osprey had become entangled in discarded fishing line and was hanging from a tree limb over the lake.

Enforcement officers Bryan Scruggs, Ashley Thompson and Reggie Barker responded to the call. Not knowing what to expect, they brought a catchpole, climbing rope, a cage, a chain saw, tow chains, blankets and a .22 rifle.

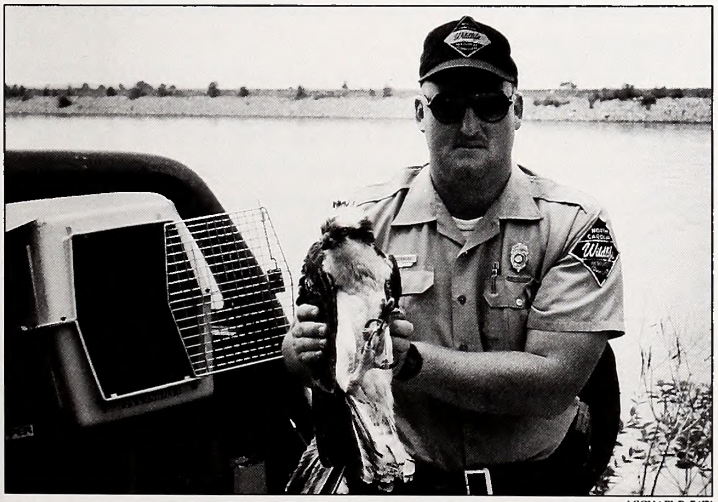
Arriving at the scene to a crowd of anxious spectators, they discovered the osprey suspended upside down about 30 feet above the water. The entangled osprey was snared to its nest tree by the monofilament and was unable to free itself. Complicating matters was the bird's mate, which would dive upon the officers when they approached.

The dilemma was how to free the bird without injuring it while avoiding injury from the protective mate. There were several problems to overcome. The height of the tree and the fact that it was located in deep water ruled out the use of a ladder. Tree climbing was also quickly ruled out since the bird was out on a limb and the tree was old and rotten. After some thought, Officer Barker indicated that he could shoot the line in half without injuring the bird.

With the osprey flopping above, the upset mate circling overhead and spectators galore, Officer Barker mounted the bow of the boat, which was bobbing in the choppy water. Barker proved his marksmanship, though, by clipping the line with his third shot. The bird fell and landed in the water and was retrieved by the other officers. The nearby crowd gave a cheer as the bird was freed, and one spectator was heard commenting, "That officer could sure shoot."

The osprey was transported to a wildlife rehabilitator. During its panicked attempt to free itself, it had damaged its wings on the tree to which it was tied, but it subsequently recovered and was released back at Jordan Lake.

*—Michael D. Faw*
*Wildlife Enforcement Officer*



MICHAEL D. FAW

***Prior to its release,** Enforcement Officer Bryan Scruggs shows off an osprey that was rehabilitated from its injuries. Enforcement officers freed an osprey by shooting the monofilament line that entangled it in a tree at Jordan Lake.*

*Book Review*

## Freshwater Fishes of the Carolinas

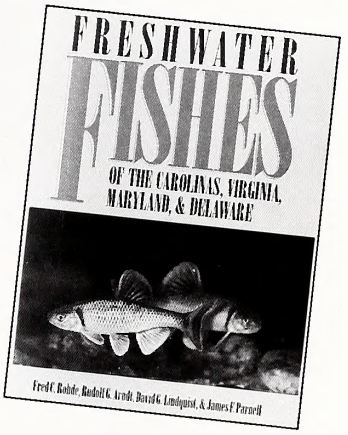
Freshwater Fishes of the Carolinas, Virginia, Maryland & Delaware *by Fred C. Rohde, Rudolf G. Arndt, David G. Lindquist and James F. Parnell, published by the University of North Carolina Press, P.O. Box 2288, Chapel Hill, NC 27515, 1994, color photos, line drawings, 222 pages.*

Few seem aware that the inland waters of North Carolina and the surrounding mid-Atlantic region teem with fish species that rival tropical species for their color and diversity. That may change with the publication of *Freshwater Fishes of the Carolinas, Virginia, Maryland & Delaware*, a book that will surely heighten interest in obscure but colorful species like the candy darter or the swamp fish.

The book provides detailed descriptions of the more than 26 families of fishes comprising more than 260 species inhabiting the mid-Atlantic region. For each species, the authors provide notes on their habits, distribution and abundance, habitat and natural history. The book also has more than 200 high-quality color photos of various species, an invaluable aid to identification. Also included is a description of the effects of deteriorating water quality on many of the lesser-known endangered and threatened species.

Sure to be of interest to aquarium enthusiasts are the tips on where and how to catch many of the colorful species, how to observe and photograph them and how to maintain them in captivity. Range maps show the distribution of each species.

Fred C. Rohde is a biologist with the N.C. Division of Marine Fisheries. Rudolf G. Arndt is professor of biology at the Richard Stockton College of New Jersey. David G. Lindquist and James F. Parnell are professors of biology at the University of North Carolina at Wilmington.




In all, *Freshwater Fishes of the Carolinas, Virginia, Maryland & Delaware* should be of interest to everyone interested in fish, be they anglers or aquarium enthusiasts, or naturalists, either amateurs or professionals.

## Calendar

The N.C. Wildlife Resources Commission's popular Wildlife Calendar will be available in early September. Calendar fans will want to place their orders early next month for the 1995 edition, as the 1994 Wildlife Calendar sold out in record time.

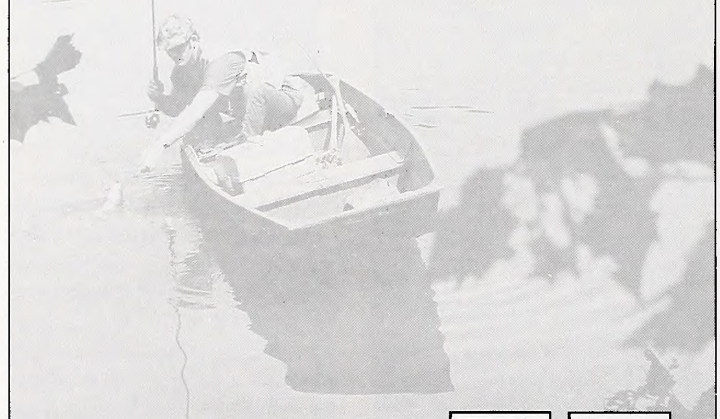
The 1995 calendar will feature 12 paintings by nationally known wildlife artists, as well as its regular almanac section and the popular guide to 1995's best fishing days.

Featured species include a whitetail deer, wild turkeys, a brown trout, a bluebird and other wildlife found in North Carolina.

Look for the full-color advert and the handy order form in the "Back of the Book" section of September's *Wildlife in North Carolina*. The price for the 1995 Wildlife Calendar will be published in the advert. The adverts will run until the calendar is sold out.

## *Only a phone call away . . .*

Call **919-715-4091** anytime and use your MasterCard or VISA to purchase most hunting licenses, fishing licenses, or a subscription to *Wildlife in North Carolina* magazine.



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## Wildlife Endowment Fund Report

**May 1994**

Principal Balance
$19,528,960.16

Interest Earned
$13,973,655.67

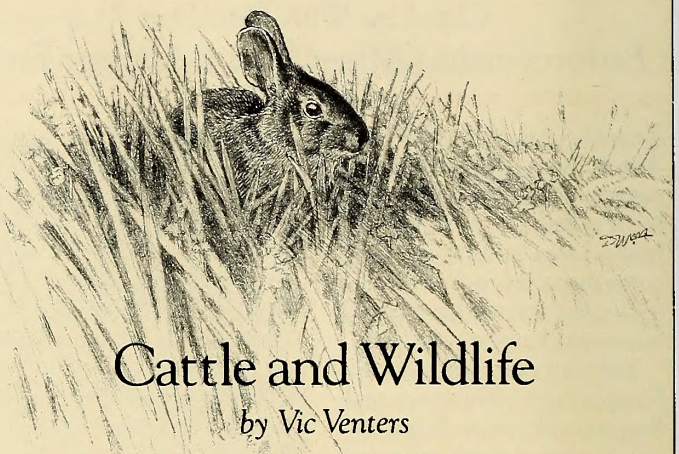
Total Receipts
$33,502,615.83

Interest Used
$5,175,203.48

Fund Balance
$28,327,412.35

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Cattle and Wildlife

*by Vic Venters*

Once a landscape of small yeoman farms, the western Piedmont of North Carolina is increasingly crowded with cattle operations these days. Unfortunately, the methods by which cattle are often managed are detrimental to wildlife species that depend on grassy cover or low-growing shrubs, two "ecozones" that almost always disappear in heavily grazed areas.

The good news is that cattle and wildlife can be compatible. In the past, we've told you about using warm-season grasses—which provide excellent habitat for many wildlife species—to complement standard cool-season forage grasses in pasture lands.

On many cattle farms, grazed pasture land runs straight to a block of mature forest, with the critical "transition" zone of grasses and shrubs between the two completely missing. There are several easy modifications that will recreate this type of habitat. Unless cattle need a shady spot, for example, consider fencing them out of wooded areas. Once in a wooded tract, cattle will destroy all understory except for mature trees. If cattle do need a shaded area, fence in only the wooded area needed, not an entire woodlot.

You can also modify fencing techniques to recreate the transition zone between woods and pasture land. Instead of fencing in the woods, or fencing directly down the treeline, extend your fencerow about two tractor widths from the woods. This ungrazed zone is wide enough to allow sunlight to reach the ground and grassy and shrubby vegetation will soon reappear in the ungrazed area.

The zone will also be wide enough to allow you to disk and plant annual or perennial wildlife foods if you choose. Or, you can manage by simply allowing the strip to grow natural seed or fruit-producing plants. Half of the strip can be mowed every few years to prevent trees from encroaching, and the other half a following year. This zone will be of tremendous benefit to species like quail, rabbits and many songbirds.

For more information on fencing woodlots for wildlife, contact your county extension agent or your district Wildlife Commission biologist.

# 1994 North Carolina Sportsman's Print now available!

"Morning Expedition"
*painting by Robert Flowers*

A black bear sow and her three cubs head across one of North Carolina's grassy mountain balds in search of their morning meal. This painting by Summerfield artist Robert Flowers beautifully tells the success story of the state's black bear population. Through careful, scientific research and management, a bright future is being ensured for these magnificent creatures. By purchasing a copy of this limited-edition print from an art dealer, you can help support the many research and management programs of the N.C. Wildlife Resources Commission. You'll also be getting a rarely seen view as captured by the brush of one of North Carolina's best wildlife artists. Stamps can be purchased from any wildlife license agent.

## Summer Invitation

Is there a scene more typical of summer than this one? Wouldn't you like to sit right here and let the next wave curl around your feet? Please be our guest.

Second-class postage paid at
Raleigh, North Carolina

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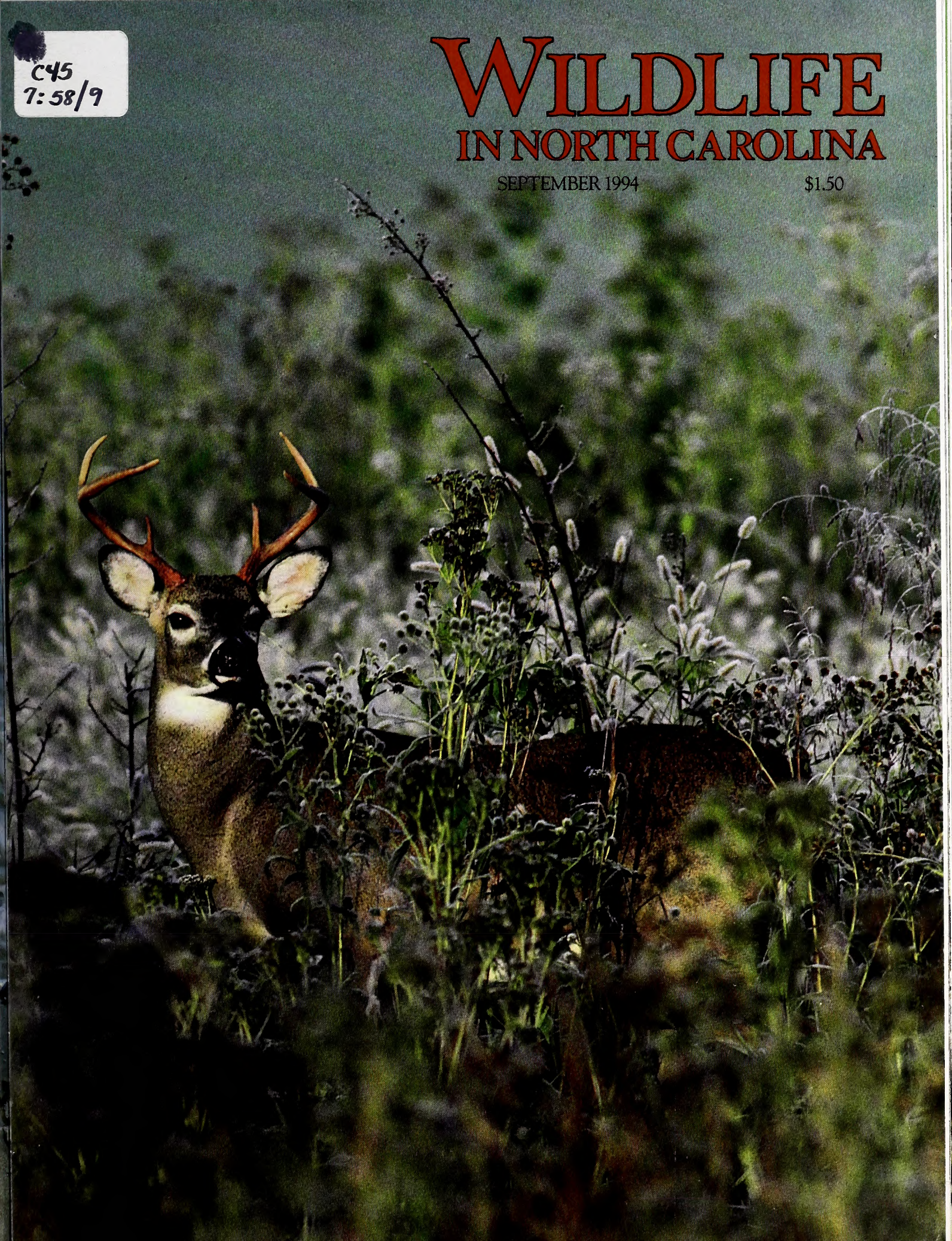
# WILDLIFE IN NORTH CAROLINA

SEPTEMBER 1994 $1.50



# The King in Eclipse (Part II)

*by Jim Dean*

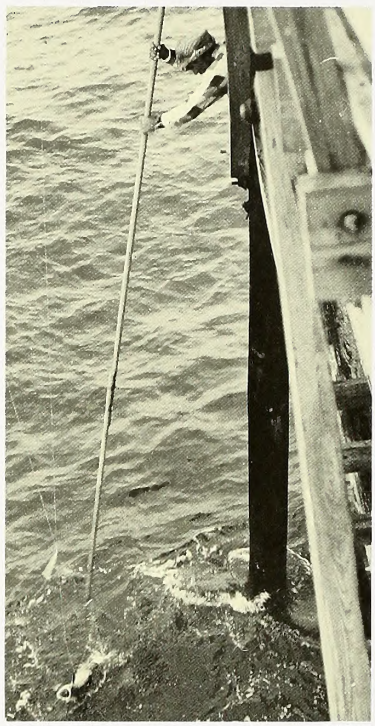
When the strike came, Scott Dean was leaning over the rail at the end of the pier fishing a homemade Gotcha lure constructed out of a ballpoint pen and tinfoil. He retrieved it in short, rhythmic snatches to make it dart back and forth. There had been a few Spanish mackerel around, and it was the right time—late afternoon in the heel of September with a flush tide.

The rod bent and the drag slipped. Scott figured it was a small Spaniard, but line began pouring off the spool so rapidly that its bulk shrank before our eyes. Scott stood up, clearly surprised, and backed off the drag.

"That ain't no Spanish,"somebody said, whistling in awe. "No big bluefish, neither. Maybe an albacore, except there ain't been none around lately."

We held our breath as the fish swiftly passed the 100-yard mark showing no sign of weakening. It couldn't be a king mackerel, we all thought. After all, this was 1991, and the big, solitary kings that had once been so commonly caught off the ends of North Carolina's 30-odd ocean piers had all but disappeared a decade ago. Besides, hooking a king on a plug had never been all that common even during the heyday from the 1950s to the '70s when live-bait fishermen were scoring regularly. And yet, this fish was now 150 yards at sea, and behaving very kinglike.

"You done hooked a ghost," one of the old hands said.



JIM DEAN

*King mackerel pier fishing in the 1960s.*

When the fish finally stopped, Scott couldn't have had more than 20 yards of line left. After 10 minutes of pumping and reeling, we finally got a glimpse of 15 pounds of quick silver. It was a king all right, but while I was sprinting the length of the pier to try to find a gaff or net—such items would have been readily available in the '70s—Scott's ghost made a desperate dash under the pilings and cut the line.

Scott has never caught a king from a pier, and as it stands now, it is unlikely that he ever will. An era has passed, and no one seems to know exactly why. Indeed, the disappearance of this inshore population of big, solitary king mackerel has gone largely unnoted even by marine biologists.

"According to the National Marine Fisheries Service Mackerel Stock Assessment, the king mackerel population is considered to be healthy in the Atlantic, although the Gulf population is still overfished," says Linda Mercer, marine fisheries biologist with the N.C. Division of Marine Fisheries. She agrees, however, that the data for this assessment goes back only 10 years, and the big pier-caught kings were already nearly gone before then.

Theories abound. One is the admittedly unlikely hope that this may be simply a cycle, and that the fish could someday return much the same as the big Hatteras blues did in the 1960s after a mysterious 30-year hiatus.

Another possibility is that these inshore kings may have been part of a largely resident population that wintered off our own coast—fish that had some special instinct to return to the same inshore feeding grounds each year. Even portions of more migratory populations may have had this instinct to feed in inshore waters when passing through. In either case, if these king mackerel were severely overfished, or their forage disappeared, then other kings might lack the instinct to replace them. A similar explanation has been given as a partial reason for the decline of those Canada geese subpopulations that had the instinct to winter in the South, even though the overall goose population in the Atlantic flyway remains very high.

It may be coincidence, but the disappearance of these fish corresponds precisely with the rapid growth of inshore slow-trolling for kings by recreational sportfishermen and the popularity of king mackerel tournaments. Catch-and-release practices aren't very successful, so fish are kept. Is it possible that this intense inshore sport fishery has had an impact? Compared to slow-trolling catches, the earlier pier catch was miniscule.

Similarly, while commercial harvest of king mackerel is very limited here, commercial gill netting is extensive in Florida, and at least some of our king mackerel migrate from there. Another factor could be the decline of menhaden, an inshore forage species favored by kings. Kings follow their food, and populations of menhaden declined sharply under commercial pressure during the same period the inshore mackerel population was disappearing. That impact, combined with the quantum increase in inshore slow-trolling, could pack a double whammy.

If—big *if*—menhaden populations rebound, it will be interesting to see if the big kings return to eat them. It would be nice to dig the old rods out of storage and set out a couple of live baits. It would be even nicer if a 30-pound king discovered Scott's treble hook in one of them. He has paid his dues.

September, 1994
Volume 58, Number 9

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# WILDLIFE IN NORTH CAROLINA

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*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **What's Good for Buck** *written by Vic Venters*
*photographed by William S. Lea* © 1994
*If you want big, healthy buck deer with impressive antlers, you've got to give 'em time to grow up. And it doesn't hurt to thin out some of the distaff competition.*

10 **Multitudes of Mullet** *by Bob and Mary Simpson* © 1994
*The jumping mullet may be commonplace, but it's also a valuable commodity and a treasure trove of lore. For that matter, did you ever eat one?*

16 **After Opening Day** *by Vic Venters*
*It's often easy to find doves on opening day, but what about the rest of the season?*

20 **Mountains in the Mist** *photographed by William S. Lea* © 1994
*What is so inviting about these ancient geological upheavings? It must be the mist, that delicate, slanting light and the promise of fall color.*

24 **Workers of the World**
*written and photographed by Harry Ellis* © 1994
*The carpenter ant is a tireless workaholic with a rigid social order. And you thought you were in a rut.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

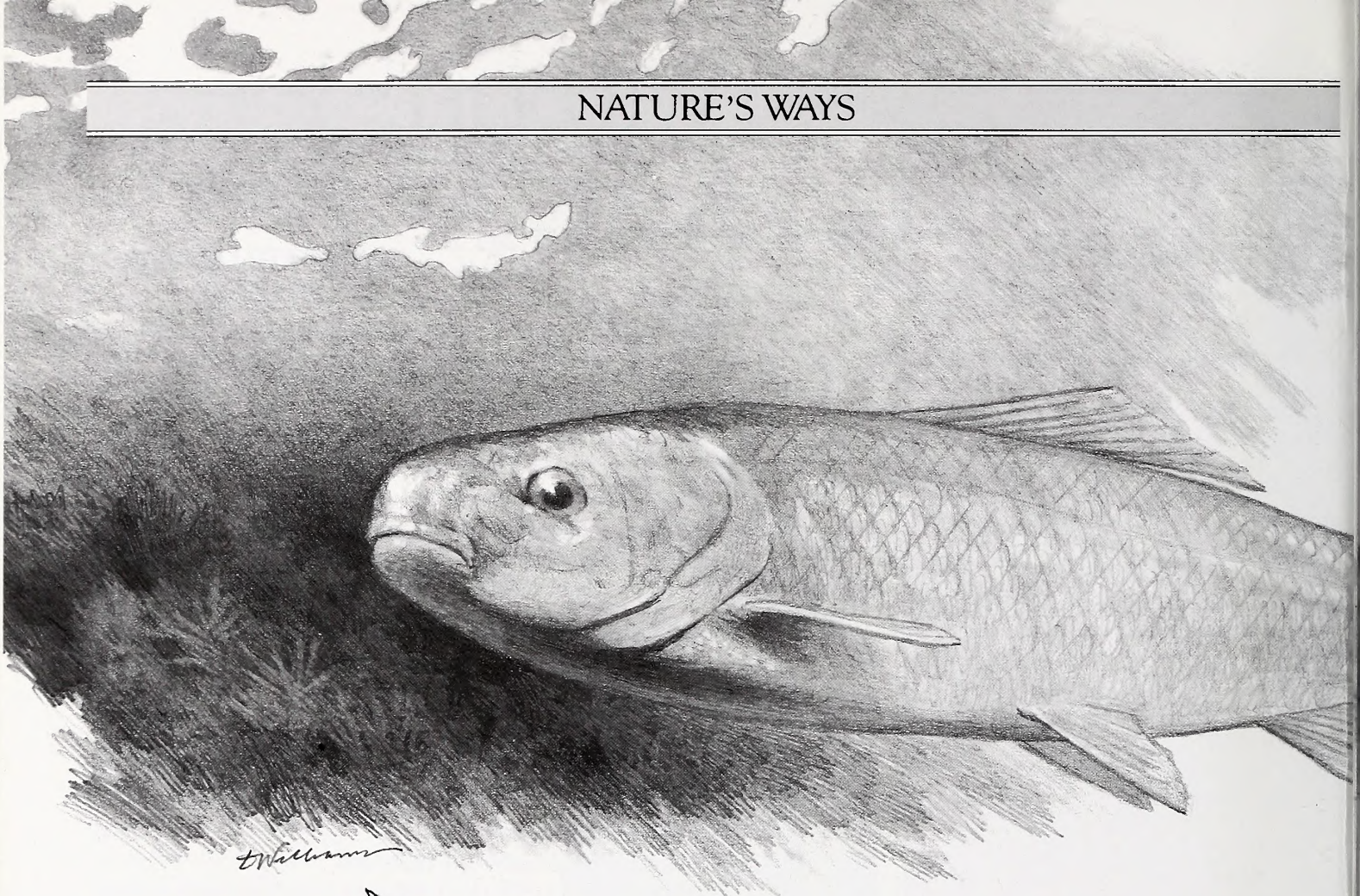
**Nature's Ways** *by Lawrence S. Earley*

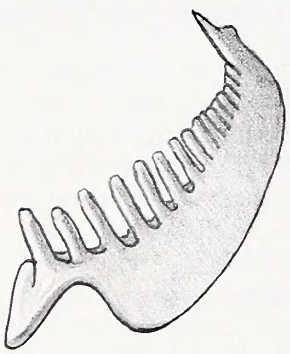
**Back of the Book** *by Vic Venters*

**Wildlife Through the Year** *by Vic Venters*

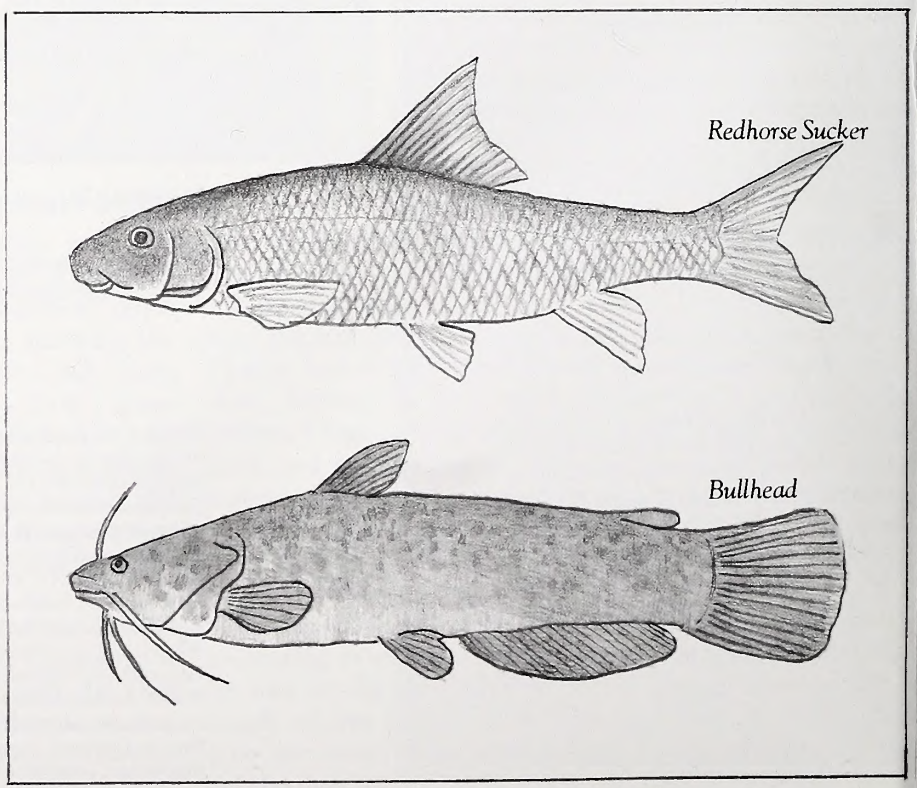
**Cover** *This white-tailed deer has spotted the photographer, and will surely bolt at any moment. Photographed by William S. Lea.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**





**Almost all** *suckers have teeth in their throats that look like combs and that strain algae, detritus and small animals from the mud and sand at the bottoms of rivers and streams.*

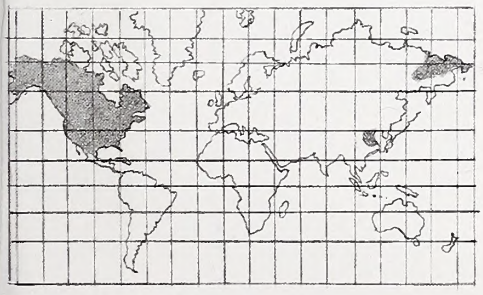



**Suckers and** *catfish are both bottom-feeding fishes with different adaptations to help them exploit the food-rich benthic zone. Catfish have several pairs of sensitive "whiskers" or barbels that help them negotiate the often muddy water in which they live. Similarly, mouths beneath their bodies adapt suckers to bottom feeding.*

# Suckers Are for Real

*written by Lawrence S. Earley/illustrated by David Williams*

***Suckers inhabit** a variety of habitats in North Carolina—fast cold-water streams, sluggish Coastal Plain rivers, and reservoirs. The southeastern United States has the most diverse sucker populations in the world.*



***Suckers today** mostly inhabit North America to which they migrated from Asia. Sixty one species exist worldwide, including some in China and eastern Siberia. Twenty five species are found in the mid-Atlantic region, and 23 species occur in North Carolina.*

Sucker . . . the word does not inspire. Its two drab syllables linger on the tongue like a word your mother might have warned you against saying in public. *Ah, the lowly sucker*, one might say with absolute ecological correctness, for suckers' role in life is to ply the ignoble bottoms, unlike largemouth bass that dance above the surface shaking their magnificent gill covers.

No doubt it's the humble haunts of the suckers, as well as their nondescript name and description, that have bestowed such poor reputations on the fish. Suckers are among the fishes—they are related to catfishes and minnows—that are marvelously specialized to make their livings at the bottoms of streams and lakes. Inhabiting North Carolina are 23 sucker species, in every aquatic habitat, from high-elevation streams to low-salinity estuarine waters. To make full use of bottom habitats, long ago they evolved mouths positioned on the underside of their heads. Curiously, this adaptation develops only as the fish matures. Young suckers have mouths at the end of their heads, like most fish, and tend to feed near the surface; their mouths shift below their bodies only as they grow older. The name sucker comes from another specialized feature—thick, protrusive lips loaded with sensitive nerve endings that are adept at detecting food.

Because bottom sediments are often exceptionally rich in nutrients and foster high populations of benthic organisms, it's no wonder that suckers and other fish evolved to exploit this food-rich region. Yet ecological specialists like suckers often pay a price for their success. Suckers need clean water in which to live and to feed and they are not tolerant of pollution. Too much silt—from erosion caused by farming, development and other human activities—can cover the gravel that they use for their "redds," the beds where they spawn. Since suckers feed on the bottom, silt can also cover their very food sources. Unlike many fish, suckers don't eat drifting organisms in the water column. And in hot weather, decomposing organic remains on lake bottoms can deplete the oxygen in the area; the bottom-dwelling suckers are incapable of adjusting by rising to the surface. The very adaptation that has ensured their presence in North America for at least 65 million years can make suckers vulnerable to natural as well as human-caused environmental events.

Most suckers have a row of 16 comb-like teeth on the fish's pharyngeal arch that strain and possibly even chew a diet consisting mainly of algae, detritus and tiny animals—zooplankton, insect larvae and aquatic insects. Three species world-wide, one of them extinct, have molariform teeth—flattened lower teeth adapted for crushing mollusk shells. The river redhorse (*Moxostoma carinatum*) is the only sucker species in North Carolina that preys on mollusks, and it may be stressed by the decline of mollusks in North Carolina's rivers and streams.

Suckers are members of the Cyprinid order and belong to the Catostomidae family. Evidently they originated in Eurasia and migrated to North America many millions of years ago. Today they range from the Arctic Circle south into Mexico, with the most diverse number of species in the southeastern United States.

It's no fault of their own that suckers are unappreciated, except by the few that enjoy their tasty, if bony, flesh. Ecologically speaking, suckers glitter like gold; it only requires a little scraping to remove the tarnish that covers their name.

# What's Good for Buck

If you want big, healthy buck deer with impressive antlers, you've got to give 'em time to grow up. And it doesn't hurt to thin out some of the distaff competition.

written by Vic Venters
photographed by William S. Lea ©1994

Let us pose a hypothetical question. You are the president of a 25-member deer club that has just acquired exclusive access and control of 3,500 acres of prime hunting habitat in the southeastern Piedmont. The property is flanked on one boundary by a river and rich hardwood bottomlands, on another by an area where all hunting is strictly controlled. Deer are abundant on your lease—there are so many, in fact that farmers are complaining about browse damage. You commonly see herds of 50 to 60 does; spikes and young bucks seem abundant.

How would you manage it?

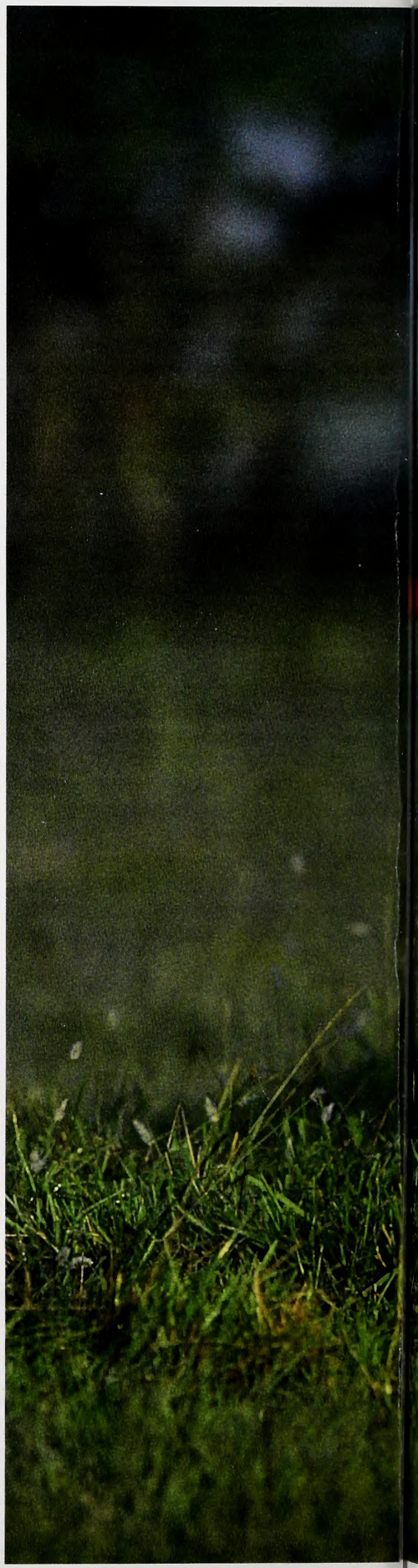
It's safe to say that many clubs would assume traditional management methods—vigorously harvesting bucks, especially the spikes and small bucks, to "improve" the herd's genetic characteristics and also taking a few does to put meat in the freezer. Then, you'll hope the lease produces a couple of "big ones" each year, preferably in front of your stand.

The problem is, however, that this type of management doesn't produce a lot of "big ones." Yes, you'll have plenty of deer to shoot, but you'll probably be realizing only a fraction of your deer herd's potential in terms of trophy bucks and healthy deer.

For at least one hunting club in North Carolina, the situation described above wasn't hypothetical. When faced with these very conditions 12 years ago, the club decided to adopt a different set of management principles which call for sacrifices in the short term for the possibility of long-term gains. This club would manage its 3,500 acres for smaller numbers of quality deer rather than for sheer quantity of deer. After consulting with Wildlife Commission biologists, the members embarked on what is today called a Quality Deer Management program.

The term Quality Deer Management (QDM) has been defined as the voluntary use of restraint in harvesting young bucks combined with an adequate harvest of does to maintain a healthy deer population in balance with existing habitat conditions. While trophy bucks are a hoped-for by-product, QDM's larger goals are to produce quality deer—bucks, does and fawns—and quality deer habitat along with a quality deer hunting experience.

From browse damage on club property, it was evident that club members needed to bring the population in line with the available habitat. Their first step was to initiate a heavy doe harvest, taking between 60 and 80 does per year. These days, each club member is required to take at least one doe by Thanksgiving and another doe by the end of the season. The harvest of young bucks is strictly regulated. No bucks with an inside spread of less than 15 inches can be shot. It should be emphasized that the minimum spread dimen-



***While genetics plays** a role in antler development, habitat quality and the buck's age are equally important for producing quality bucks.*

***When deer were scarce,*** *deer management philosophies encouraged the total protection of does and a heavy harvest of all bucks. As deer herds have increased dramatically, biologists now recommend a substantial harvest of does and a delay in the harvest of young bucks, such as this button buck pictured here, until they are mature.*

sions adopted are based on growth potential for the southern Piedmont and may not be applicable to other regions of the state. There are club fines and penalties for intentional infractions of the rules.

The accidental harvest of button bucks is also watched carefully, recognizing that some button bucks will be mistakenly shot as does. If the club's total harvest reaches 10 button bucks during the season, a fine is levied on any member who shoots an additional fawn buck.

The club adopted quality deer management principles in 1982. In the early years, the club did not harvest bucks with inside spreads of less than 13 inches. During this time, only about 15 to 30 percent of the adult bucks harvested each year fell into the 2.5 year or older category. Several years back, though, the club went to a 15-inch minimum spread. Now, bucks 2.5 years or older average 74 percent of the annual harvest. Of this last figure, about 37 percent of them are 3.5 years or older. At this age, the bucks weigh between 175 to 200 pounds and have impressive antler spreads of 17 to 18 inches.

"We're seeing overall better racks, less spikes, better size and body weights," the club president says. Adopting the QDM principles is not a magic formula, however. Despite 12 years of permitting their bucks to grow, club members still harvest very few that are 4.5 years or older.

"These old bucks get really hard to kill," explains the club president. "We see some in the summer, but during hunting season we don't know whether they all become nocturnal or whether poachers are getting most of them. We worry about that some."

For many clubs, just knowing that there are older bucks out there enhances the hunting experience, regardless of harvest. "Overall our members have been very pleased with the trophies they are getting," the club president says. "Adopting these guidelines has been a real educational experience for a lot of our hunters. Many of them used to shoot the first buck they saw, regardless of size. Now they pass these smaller bucks up and really observe their behavior and movements. They say it's made them better hunters."

At this point readers will have noticed that we haven't divulged either the name or location of the club, nor the names of its general members or president. Because of the potential for poaching, anonymity is a necessity.

Managing deer for quality rather than quantity is a concept that has evolved as North Carolina's deer population first recovered then expanded to perhaps exceed pre-European settlement densities. In 1900 North Carolina's deer population stood at only about 10,000 because the herd had been decimated by two centuries of forest clearing and virtually unrestricted kill, much of it for market hunting and subsistence. Because deer had virtually disappeared from many areas of the state, restrictive regulations were imposed to protect the remaining population. In 1927 North Carolina passed a "bucks only" law, making it illegal to kill does.

In 1944 deer restoration efforts began to gain support in North Carolina, but the fastest growth and spread of the deer population took place in the 1970s. The prevailing technique was to stock deer into areas where populations were depleted. Virtually all bucks were still considered fair game, however, while does were "sacred cows." This combination of improved regulations, better protection, more forested land and restoration efforts led to steady growth in the state's whitetail population.

The "shoot all bucks, save all does" philosophy governed management thinking until the early 1960s, when burgeoning populations and sex ratio imbalances led biologists to recommend a somewhat heavier doe harvest to stabilize populations. Virtually all bucks, however, were still harvested. One assumption that biologists held at the time was that the increased harvest of does could alone bring about bigger bucks. Biologists discovered, however, that while this works in some areas, it doesn't work in all, particularly in the Southeast.

By the 1970s, continuing research into whitetail ecology was beginning to dispel many of the old management philosophies that had previously been accepted as gospel. Texas is credited with being the birthplace of quality deer management. In 1975 Texas researchers Al Brothers and Murphy Ray released the pivotal book *Producing Quality Whitetails*, a work that popularized the quality deer management philosophy.

One of the things biologists recognized was that in order to have healthy herds, a sub-

stantial number of does need to be harvested. Because bucks and does are born into the population in equal numbers, they must be removed in fairly equal numbers if densities and sex ratios are to remain stable. Another finding was that whitetail bucks don't really mature until they reach 5 to 8 years old. During the first several years of a buck's life, most nutritional intake goes toward body growth, with antler development taking a poor second place. For example, research indicates that the average buck shows only about 10 percent of its antler potential at 1.5 years of age. But as the buck matures more nutrients become available for antler growth, with peak development taking place from the time the buck is 5.5-years old until he is 7.5-years old.

Thanks to ingrained shooting habits, however, most bucks in North Carolina never see the end of their second year. Yearling bucks are the most overharvested segment of the deer population and are extremely susceptible to modern weapons during today's hunting seasons. It's estimated that about 80 percent of all yearling bucks are harvested each year. What this means is that the average hunter may seldom see a true trophy buck that has lived to reach its full potential in terms of size or antler growth.

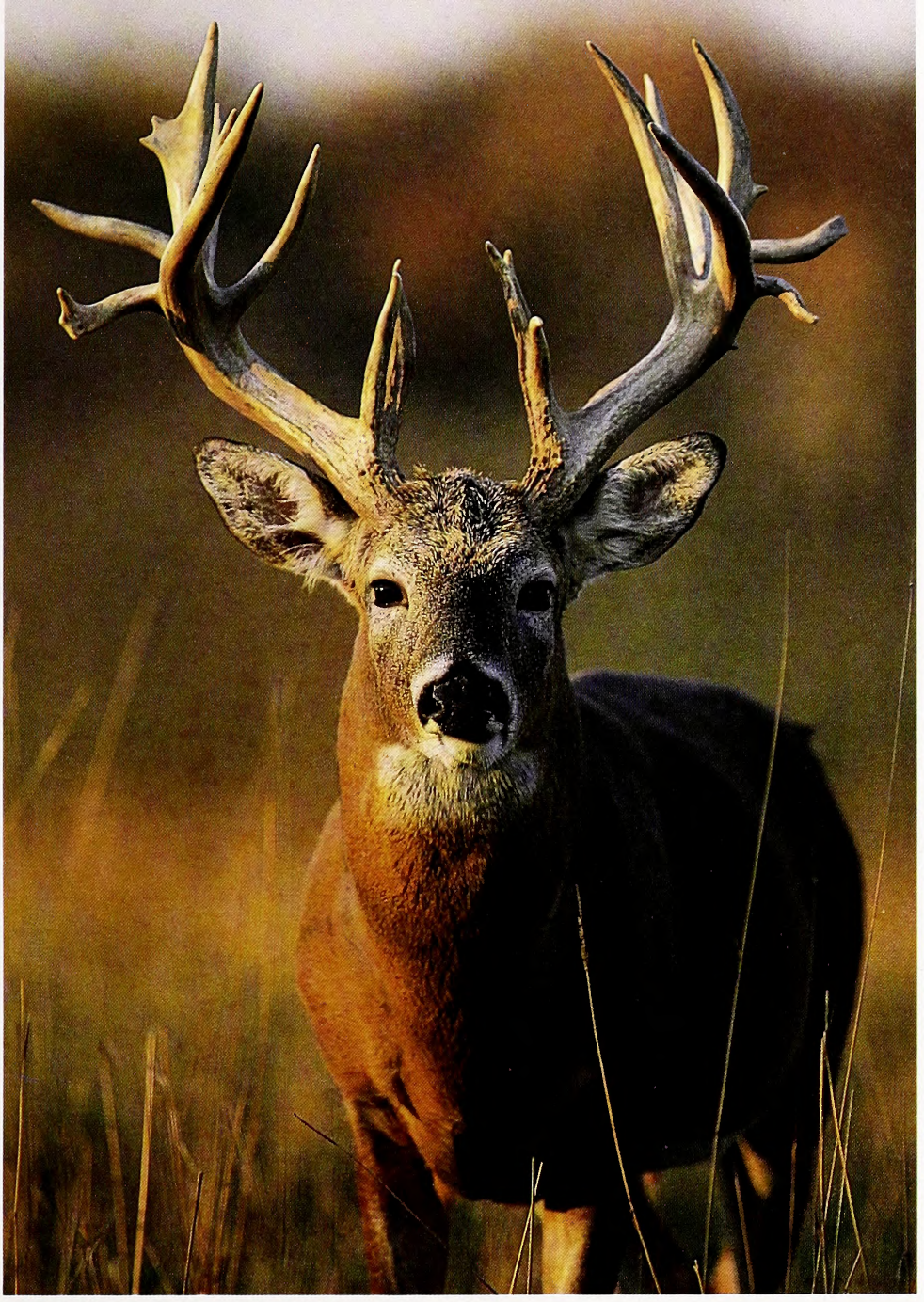
Another highly important finding led to the debunking of the myth "Once a spike, always a spike." For years hunters were encouraged to shoot spike bucks because it was thought that they would forever emain spikes or that they would pass on inferior spike genes. While it is true that some yearling spike bucks will remain spikes for their entire lives, most yearling spikes will develop impressive racks if they live long enough to mature and have a good diet.

This isn't to say that genetics is not extremely important in producing big bucks. It is, but genetic influence is only a part of the parcel. In southeastern states like North Carolina, the age that the deer lives to and the quality of its nutritional intake also play very important roles in antler size and development.

In essence, QDM allows young bucks to mature while enough does are harvested to keep sex ratios balanced and populations in line with the available habitat. And it works.

So why don't more hunters adopt it for their property? There are several reasons. The effect on hunters from half a century of managing deer under a "bucks only" philosophy may be likened to Smoky the Bear's much-publicized "Forest Fires Kill" campaign. Both programs have worked, but perhaps too well. Just as there is a need for *prescribed* burning to replicate many natural forest ecosystems, there is also a need for controlled harvest of does to create healthier deer herds.

"The harvest of antlerless deer, particularly adult does, is an integral part of quality deer management," says Joe Hamilton, a native of North Carolina and biologist with the South Carolina Dept. of Natural Resources and one of the chief proponents of QDM in the Southeast. "Many hunters still resist it, however."



***During his first** five years of life, much of a buck's nutritional intake goes toward skeletal and muscular development. Not until the buck truly matures does it have the potential to produce spectacular antlers.*

Another problem has been dealing with inflated expectations. Unfortunately, the success of early QDM techniques in Texas and other fertile states led to a rash of "how to grow trophy buck" articles in the popular sporting press. These articles often caused hunters to have unrealistic expectations. Many clubs adopted QDM principles for a short time, only to drop them when monster bucks didn't immediately materialize.

And, in truth, it can be frustrating for hunters to have to pass up decent young bucks when neighboring clubs or hunters may be shooting all bucks the same size. And no doubt about it, those older bucks are craftier and harder to kill.

Despite the lingering "bucks only" tradition in many areas, there is every indication that more and more hunters are becoming interested in Quality Deer Management. Because deer are so abundant now, many hunters are already looking for more than simply killing another buck, regardless of size. QDM offers the extra challenge of hunting mature whitetail bucks. South Carolina has led the way in the South-

MELISSA McGAW

***Early muzzleloading** and primitive weapons seasons are an excellent time to harvest does, and will help balance sex ratios going into the breeding season.*

east, with 700 clubs and 2 million acres enrolled in QDM principles. The best hunters are also becoming better educated about deer biology and ecology.

"Today's hunters are better informed than ever before," says Joe Hamilton. "Involvement in quality deer management extends the role of hunters from mere consumers to that of managers."

Clubs interested in adopting QDM principles should keep a number of larger points in mind. One of the most important concepts is the relationship of habitat to deer numbers and quality. "The characteristics of deer populations are closely related to the quality of the habitat in any given area of North Carolina," says Scott Osborne, the Wildlife Commission's big-game program coordinator. "The quality of habitat is extremely important to growth and antler development. Deer raised in the better soil regions of the state generally have better-quality foods to eat and, consequently, will be healthier and have better physical characteristics than deer from poor habitats.

"The same applies to the relationship between deer numbers and habitat," Osborne says. "Carrying capacity is a term biologists use to describe the maximum number of deer a habitat can support on a sustained basis without destroying the vegetation of the area. When carrying capacity is exceeded, physical growth and condition of the deer suffer.

"Carrying capacity can differ from region to region, depending on the quality of habitat," Osborne says. "For example, the carrying capacity in the southern Appalachians is considered to be around 10 to 15 deer per square mile. By contrast, in the Roanoke River bottomlands the carrying capacity is about 50 deer per square mile.

"Back in the 1960s it was generally believed that if you wanted bigger bucks, you managed for fewer deer. That still works in some areas. But in the Southeast—the Sandhills, piney flatwoods, pocosins and mountain habitat—you can take a deer herd down to nearly nothing in terms of density and you're still not going to see any improvements because the deer are still out there eating a lot of poor-quality food. You might see some improvement, but nothing like the amount you would see in areas of better habitat.

"This is where managing for age becomes important—letting those bucks reach an age where their bodies will direct nutritional intake into antler growth," Osborne says. "In the Piedmont, in particular, our records indi-

N.C. WILDLIFE RESOURCES COMMISSION

***Restoration efforts** began in the 1940s when deer were stocked into areas where populations were no longer extant, but the big population increases were made in the 1970s. Management techniques continue to be refined as the state's deer population grows.*

cate that our potential for growing good bucks is severely limited because most bucks are killed before they see their second birthday."

Osborne urges North Carolina hunters to take full advantage of their antlerless deer regulations. Hunters should also take as many does as regional regulations allow early in the season. "In some years, as many as 40 percent of does are harvested in the last week of the season," Osborne says. "Within our current regulatory framework, we'd like to encourage hunters to conduct their doe harvests earlier, before the main rut. A buck has really wasted its energy if it breeds a doe that gets shot later. Another important objective of substantial early doe harvest is keeping sex ratios balanced when the breeding season arrives. This helps ensure that the majority of does are bred by their first estrous cycle and that the resulting fawns are born early in the spring. These early fawns will demonstrate better body size and antler characteristics as yearlings and as 2.5 year olds. Hunters should take greater advantage of muzzleloading, primitive weapons and our anytime deer tags."

Record keeping is extremely important, as it allows advising biologists to chart growth patterns from year to year. Clubs should track the numbers and ratios of bucks and does harvested, antler measurements, deer weight and condition and keep jawbones for analysis by biologists.

In poor habitat conditions, supplemental habitat management—such as adding food plots or fertilizing mast-producing trees and shrubs—can improve the quality of deer and antler characteristics. But don't expect a miracle. "You are not necessarily going to see extra nutrients converted into extra antler growth unless the harvest of bucks is delayed," Osborne says.

Controlling or eliminating poaching is extremely important. "It is no exaggeration that a poacher with a spotlight can undo in one night several years of hard management," Osborne warns. "Firelighting may be the most important factor limiting trophy bucks in the state. Deer are extremely vulnerable to this. If law-abiding hunters want to see more large bucks, they are well advised to report all violators."

Bigger is better, especially if your neighbors are involved. While it is hard to adopt QDM principles on areas of less than 1,000 acres, this problem can be overcome if neighboring clubs or landowners join in. That can also alleviate some of the frustration inherent when neighbors shoot deer that QDM hunters pass up. In one Piedmont county, nearly a dozen hunt clubs have combined acreage for management purposes and will be managing a 19,000-acre tract under QDM principles.

Quality Deer Management is undoubtedly good for deer. Perhaps of equal value is the good it can do for hunters. QDM emphasizes hunter ethics such as restraint, sportsmanship and respect for the animal. In these days when many deer hunters are perceived in a less-than-favorable light by much of the nonhunting public, the widespread adoption of QDM principles will make us better hunters, and that's good for everyone. ☐

## Putting Quality in Your Deer Management

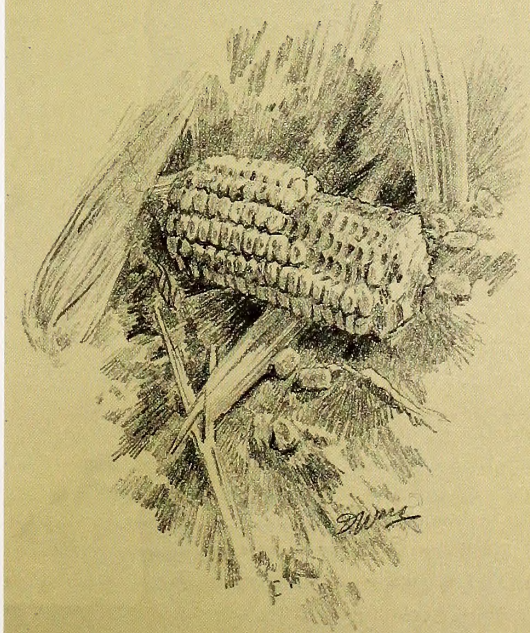
The N.C. Wildlife Resources Commission has a program for clubs or individuals interested in adopting QDM principles. The Deer Management Assistance Program will give you an opportunity to work with Commission biologists who will help set a customized plan to manage lands for the healthiest herds possible.

Clubs should have access to 2,000 contiguous acres or more, and members must provide data from deer that are harvested. From this data, biologists can interpret the precise management steps that need to be taken to improve deer herds. Guidelines for the types of bucks and numbers of does to be harvested will also vary from region to region. For more information write the Deer Management Assistance Program, N.C. Wildlife Resources Commission, 512 N. Salisbury St., Raleigh, N.C. 27604-1188.

A relatively new private conservation group can also offer help. The Quality Deer Management Association was founded in South Carolina in 1988. Its aim is to educate hunters about quality deer management philosophies—not only how to implement QDM management principles, but also the importance of ethics and sportsmanship. The Association publishes an excellent color magazine, *Quality Whitetails*, and a newsletter.

From a small beginning in South Carolina, the association has expanded to 32 states and 4 foreign countries.

For more information write the Quality Deer Management Association, P.O. Box 8116, Greenwood, S.C. 29649.



# Multitudes of Mullet

The jumping mullet may be commonplace, but it's also a valuable commodity and a treasure trove of lore. For that matter, did you ever eat one?

by Bob and Mary Simpson ©1994

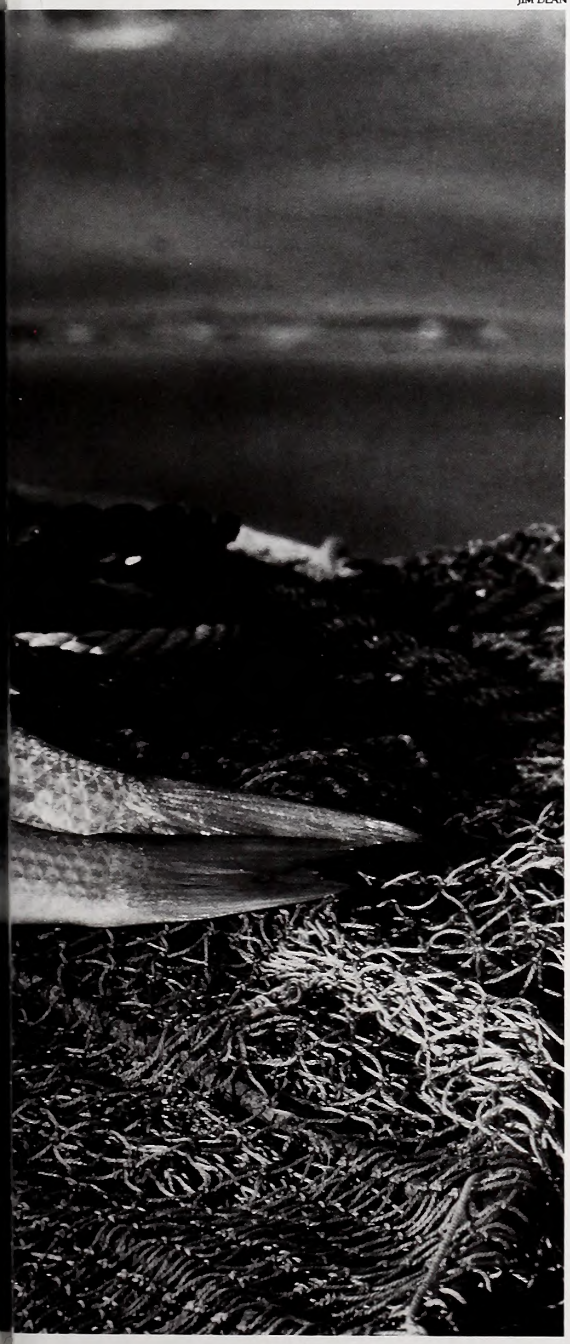
Beneath a warm Carolina sun, still waters of a back creek mirror gulls lazying overhead and pelicans gliding in noiseless, somber formation. There's a sudden explosion and a torpedo-shaped fish leaps clear of the dark waters. A glitter of spray and it disappears back into the depths. You have just had a brief glimpse of one of Carolina's most abundant, economically important and least understood fishes: a fish so popular that at one time the copper wind vane atop Cape Lookout Lighthouse was in the shape of a mullet.

Carolina's plebeian jumping mullet—officially the striped mullet (*Mugil cephalus linnaeus*)—is also called big-eye, pop-eye and goggle-eye mullet or, to some Yankees, the bluefish mummichog. It is known to coastal waters from Maine to Brazil, from southern California to Chile and among the Hawaiian Islands. Silvery with dark horizontal stripes, this powerful fish

has been known to reach three feet in length, especially in warmer portions of its range. It is easily recognized by its very small mouth, but it is a vegetarian feeding on algae and mosses. Even so, it has been known to pick up a fly or small insect for dessert. Its abundance was evident in North Carolina's commercial landings in 1902, which exceeded 8.5 million pounds, but stocks have been declining ever since.

Lore abounds about this fish. For example, when is a fish a bird? Some winters ago, one cold, nasty day with sleet rattling against the windows and wind moaning down the chimney, I stopped at a country store in downeast Carteret County. Beyond, the seas, like white-topped graybeards, were rolling down the sound and gulls were looking miserable. Inside the emporium a half dozen weather-gnarled fishermen were sitting about absorbing the heat of a potbellied

JIM DEAN



stove, grousing about new fishing restrictions. In the background three younger men listened intently.

At a pause in the old salts' discussion, the silence was broken only by crackle of fire and moaning of wind and surf. Then came the sound of spit hitting the hot stove and the clatter of false teeth as one fisherman began spinning a yarn about loon hunting. He finished the story with "And it wouldn't surprise me none if one day the fish cops outlaw mullet fishing, like the rabbit wardens done to loon hunting. If them gov'mint men up in Raleigh ever find out about mullets they'll probably make us buy hunting licenses before we can catch one."

One of the young bystanders was puzzled. "How so?"

The old man turned around. "Did you ever hear of anything but birds having a gizzard? That's what it says in the dictionary," he said. "Doesn't say a thing about mullets having gizzards, does it? Well, they do, so if them rabbit wardens ever find out, why they'll declare mullets to be birds and close the season."

The mullet has never been recognized as a sport fish—at least here—nor is it mentioned as a game fish in IGFA records. One of the most common of all saltwater fishes, it simply lacks a friendly press. For example, Sea Grant's publication *Perceptions and Preferences For Marine Fish: A Study of Recreational Fishermen in the Southeast* does not even use the word "mullet" while eulogizing underutilized species such as sea robins and toadfish.

But although the jumping mullet is often disdained by inlanders who regard it as fit only for bait, this fish is considered by coastal natives to be among the finest of food fish. Quite recently the Asian market discovered the availability of Carolina mullet roe, and it now commands a high price overseas. Prime mullet roe sells in Japan for $50 a pound and up. Some of it—exported back to the U.S.—is sold to the chopstick trade as Karasumi. Indeed, there is growing concern about overfishing to supply oriental demands. One biologist has compared mullet to Alaskan herring. Overexploited for its roe, that once extremely abundant herring fishery has collapsed.

Mullet roe has always been highly esteemed by natives of coastal Carolina and knowing gourmets. Sometimes it's even called Carolina caviar, though the same name is applied to shad roe as well. Not many years ago it was common to see roe drying in the sun on tables and benches near the fish docks.

In judging mullet roe for the table, white roe is immature, bright yellow-orange is at its peak and red or bloody roe is overripe. It may be baked, broiled, poached or mingled with other ingredients, but probably the most popular treatment is to dust the roe with flour and saute it in butter and finely chopped onions until toasty brown; bits of bacon and parsley may be added before serving over toast, with grits, of course. French chefs were said to have assured royalty that, like rhinoceros or unicorn horn, mullet roe would greatly enhance virility and libido.

California—which, like Texas and Alaska, has a reputation for claiming the largest of everything—reports an undocumented boast of mullet weighing up to 25 pounds caught in the Salton Sea. Californians fish mostly by snagging, using a large treble-

***Each fall,*** *vast schools of jumping mullet pass along our coast, yet they are largely unnoticed except by fishermen who celebrate their arrival as a harbinger of the season's best fishing. Sport fishermen value them as bait and families have traditionally netted them for their own use. They are also an important commercial fish.*

**In this** *photograph (right) taken on September 8, 1942, these mullet are being packed in salt in large wooden buckets near Harlowe in Carteret County. County high schools still celebrate the annual mullet run as football teams contest for the annual "mullet bucket." However, today the winner's bucket—or trophy—is filled with hamburgers. At Nags Head (below) in 1951, these fishermen unload a net from a truck and make sure it isn't tangled. A surf boat, a dory in this instance, is used to carry one end of the net through the surf to intercept passing schools of migrating mullet.*

N.C. MARITIME MUSEUM, BEAUFORT

N.C. MARITIME MUSEUM, BEAU

BOB SIMPSON

***Although** fishermen strained to haul in the heavy net full of mullet in earlier times, tractors eventually helped relieve them of that chore and also helped move the boats. These fishermen and helpful onlookers are hauling a net—or is that tractor stuck? Clearly it's no concern of one salty dog.*

hook rig. Because the mullet's large scales form a solid armor and are difficult to penetrate, snaggers remove the barbs and file the hook points to needle sharpness. A mullet that exceeds 10 pounds is rare in North Carolina, although generally, the farther south one goes, the larger the mullet.

A more sportsmanlike manner of fishing, as practiced among Carteret Countians, is the use of a very small, long-shanked hook, size 16 or even smaller, baited with a small bit of garden-variety earthworm. No weight is used. Experts fish the back sloughs, tidal creeks and estuaries, using a cane rod. Another highly recommended practice, common in Florida, is baiting a small hook with green moss or sometimes sweetened dough. Sports fishermen should remember that the mullet is spooky, and its mouth proportionately very small. Because it is basically a vegetarian, it is not an aggressive feeder and will not pursue moving bait or strike plugs, spinners or large baits. The mullet presents the extreme test of a fisherman's angling skill, and to catch one by hook and line elevates the angler to the rank of master piscator.

At the last International Suck Mullet Tournament on Bulls Island, South Carolina, the winning fish was taken with a small red worm. In the Gulf and especially along the Mexican border, very light fly rods, gut leaders and flies are used to catch mullet. The most popular fly is a black gnat. A large mullet caught on a fly rod is as strong as a bulldog, and its repeated jumping is a real test of tackle. In parts of southern California it is considered such a desirable fish among hook-and-line anglers that numerous attempts have been made to outlaw commercial fishing in those regions.

Sport fishing for mullet is also growing in popularity in South Florida. There, it's considered sporting to fish the bottom using a very small hook baited with a tiny morsel of salt pork or the fat part of bacon. Fly fishermen employ various dry flies, the black gnat again being preferred. Fishing calls for a very delicate touch. Mullet associate in schools of different sizes. Their natural spookiness will send them scooting at the slightest disturbance, even a passing shadow. The fish most commonly strikes a fly just as it touches down, so it's best to present the fly delicately and avoid drag (does that sound like freshwater trout fishing to you, too?).

While it's common knowledge that mullet swim in large schools as protection from predation, ecologist Charles "Pete" Peterson, UNC Institute of Marine Sciences, Morehead City, has observed that fingerling mullet are able to actually travel faster by forming a school that's diamond shaped, much the same as a V formation aids migrating geese.

The jumping mullet constitutes a major Carolina fishery. Landings peak in autumn, from late August through November. The fish are around during winter, though in small numbers. The juveniles gather in deeper holes and warmer waters, rapidly increasing in size and beginning to move toward the sounds by midsummer.

Carolina's first major wind shift of autumn is known as a Mullet Blow. Some disagree on which of several shifts may be the official Mullet Blow, but

it requires a passing weather front of considerable strength, a major temperature plunge of several degrees and strong, shifting winds that finally come out of the north or northwest. The sudden chilling of the water apparently excites the mature mullet, causing them to school in the sounds in preparation for departure to sea. As late as 1948, some marine biologists wrongly surmised that the fish spent their northern winters in hibernation.

The importance of a Mullet Blow to local economies, especially along the central Carolina coast, has diminished over the years, but old-timers tell of their elaborate preparations for the annual mullet runs. Three-quarters of a century ago, shacks of every description—often rudely constructed of branches and brush to form a windbreak and some shelter from the rain—dotted the Outer Banks from Ocracoke south along Core, Shackleford and Bogue. At the onset of a blow the schools begin gathering in the sounds prior to moving out the inlets on their southerly migration along the outer beaches.

Spotters stationed on dunes overlooking the sea would be watching for signs of the migrations. Once a school of worthy size was observed, the word was passed and waiting net crews, usually six to eight men to the crew, launched their boats into the surf. As soon as the boat was clear of the beach, the crew would leap aboard, man the oars and head through the breakers. It took strength and surfmanship to launch in rough weather and hold the plunging bow into breaking seas. The slightest error could be fatal—if the boat capsized it could easily crush the men or entangle them in the net and drown them.

Once clear of the breakers, one crewman would begin paying out a long net—the shore end was already secured to a pole or anchor. The boat would head directly seaward, then circle to the left to enclose the fish that were migrating southwesterly fairly close inshore.

Once off the outer edge of the school, the boat would turn shoreward, still paying out the many yards of net, until it reached the beach, where the tag end of the net was run ashore, surrounding the school. Some crewmen would leap overboard to hold down the leadline with bare toes so that the fish could not escape beneath it. Meanwhile, others would flail at the edge of the net to cause the school to circle and reduce the mullet's tendency to jump over the net to freedom. Once a school began jumping, it was follow-the-leader and much of the catch would be lost. Sometimes a second net was set as a backup.

Immediately the net crew would begin hauling in the net, pulling the catch onto the beach. Originally horses and oxen were sometimes used, but more often it was pure manpower. Later farm tractors were utilized. The more valuable fish were sorted out, and the catch boxed and loaded into a truck and taken to the market.

Fishing for mullet and other species along the beaches has been a tradition for generations of net

*These mullet fishermen, probably from Bogue Banks, pose for a lunch break portrait with their net boat. With a relatively calm surf and bright early fall weather, the big schools are easy to spot and the work a bit less grueling.*

BOB SIMPSON

crews working long-established territories. The crews were generally known by the gear owner's name, such as the Frost, Willis or Ottis crews, and worked only their sections, lest a major brawl break out. Mullet, spots and croakers were the most popular fish for the local markets. Salted and packed in wooden tubs or buckets, they were a basic trade commodity and a winter food source.

It's easy to prepare a mullet or similar fish for salting and storage. Like for hog butchering, a cool fall day is best. The fish are headed, butterflied and gutted. Old-timers saved the mullet heads and "tried them out" (cooked them down) to obtain what many insisted was the best gun oil available. The fish are then heavily coated with coarse salt and placed on a drying rack to pull out as much moisture as possible. When the fish are deemed well "struck"—that is, penetrated by salt—the fillets are layered on more salt and kept as cool and dry as practical, traditionally in wooden buckets. Before cooking, the excess salt is rinsed off and the fish soaked in cool, fresh water with two to three changes, then cooked in the same manner as fresh mullet.

A recent threat not only to mullet but to most—perhaps all—fisheries is an organism, a dinoflagellate, that at first appears to be algae. Known as Burk's bug, it was identified in 1991 by Dr. JoAnn Burkholder, biologist and research scientist of NCSU. So far, her research has revealed that this organism thrives on phosphates produced by industrial discharges and sewage wastes.

The "bug," a microscopic one-celled organism, is a recent introduction into Carolina waters. It waits on the bottom until it senses passing schools of fish, then rises, producing a dangerous toxin that is absorbed through the gills (and lungs of humans). It acts as a narcotic or poison affecting the nervous system. The dead fish are then consumed by the organism, and thus nourished, these dinoflagellates reproduce and continue their lethal cycle. The bug has been devastating to millions of fish in single outbreaks in Pamlico Sound, Neuse, South and New rivers and elsewhere in the state.

For many years yachtsmen claimed Morehead City as the most hospitable and popular of all East Coast waterfront towns. One reason may have had to do with mullet, Bump Styron and the Morehead City Yacht Basin. On a bright and sunny day in October or November the word would get around among migrating boats on the Inland Waterway that Bump's mullet roast was at hand. Bump and his cronies would have cleaned and salted the fish, assembled the grills and laid in supplies. By midday yachtsmen would gather, drooling in anticipation. A messenger would be sent to a waterfront restaurant to pick up slaw and hushpuppies, and Bump's gala would get under way. Many a cruising schedule was interrupted, and it was worth it.

Preparations were simple, and what follows is the basic recipe that has been in use on these coastal environs probably since the first human put fire and fish together.

The mullet must be fresh and preferably about 15 inches long. Check for freshness by smelling the gills; fresh fish do not smell of anything but clean seawater. Any questionable odor calls for rejection. Eyes must of course be clear and shiny.

N.C. MARITIME MUSEUM, BEAUFORT

***Not only is the** jumping mullet prized as a commercial fish, it is a regional delicacy when cooked over charcoal, with or without barbecue sauce. The roe is also highly regarded, and these roe are being sun-dried on a Beaufort dock in the 1940s.*

Head and split the fish. Butterflying through the back leaves the backbone on one side. You may prefer not to separate the parts completely but to allow the belly skin to serve as a hinge, making a butterfly spread. There's no need to skin or scale the fish. Remove entrails and scrape away the black fatty tissues lining the stomach cavity—unless you desire a stronger-flavored fish. Place fish in a cool shady place and salt heavily, preferably with canning or fine rock salt. Allow the fish to absorb the salt for at least one hour.

While the salt is striking, build a charcoal or hardwood fire. Use a stout wire screen or grill, adjusting the height above the fire to 4 to 6 inches. When the coals reach white heat, rinse the excess salt from the fish and blot dry. Brush the flesh side with oil or butter and place on the grill flesh side down. Grill long enough to brown the flesh nicely, then turn scale side down and apply any sauces you wish. Cook until done, but not too long. Skin and scales will char, but they serve to protect the flesh.

Serve skin side down with hushpuppies, coleslaw and cold drinks. You can eat with your fingers—the skin is your serving dish—and you will have a feast far too good for royalty.

My wife, Mary, having learned from a pro, goes a step further. She always broils extra mullet, debones it and uses it in a dish she calls Finnan Lisa, Lisa being the name given to jumping mullet by the National Marine Fisheries Service in an attempt to glamorize this already unique species. Like Finnan Haddie, it is a hearty mixture of—instead of haddock or cod—jumping mullet and boiled potatoes in a thick cream sauce.

Jumping mullet is not delicately flavored like flounder, but its distinctive nuttiness is unexcelled among all the finny tribe. ☐

# After Opening Day

## It's often easy to find doves on Opening Day, but what about the rest of the season?

by Vic Venters

At sundown after Opening Day dove shooting for the season ends. Dove hunting begins. From now until that last day in January, your quarry will fly faster, be smarter and do its best to avoid the glint of a blued gun barrel in a grainfield. Simply hoping for the best by choosing your shooting grounds at random will often turn out for the worst—for you at least. The doves, no doubt, will be delighted to decline your invitation to dinner.

Each year on Opening Day, hunters in North Carolina find doves that are often plentiful and unwary—if still not an easy target on the wing. But in the latter half of the first season—from mid-September to early October—doves have lost their naivete and, moreover, seem as scarce as proverbial hens' teeth. And judging by the silent fields I see two weeks after the season opener, most sportsmen have hauled down their colors to *Zenaida* and are back at fishing or preparing for deer season. But the shooter who completely forsakes doves after Opening Day is a lot like the trout fisherman who cases the rod after the mayfly hatches stop—just because the fish aren't rising doesn't mean they can't be caught. Doves are little different.

While I've had plenty of birdless days after Opening Day, I've also enjoyed superb hunts in both early fall and during the gray days of winter. Two seasons ago, for instance, I attended a late September shoot where anyone who could distinguish the muzzle from the breech had a limit in two hours. And while quail and woodcock hunting during last December's frigid cold, I located several large concentrations of birds that later provided two weeks of furious sport as the doves flew at early dawn to feed in soybean fields. Now I admit the former example came by benefit of a generous invitation to shoot an as-yet-unhunted sunflower and millet field, but the December doves I worked for.

That's the key for success after Opening Day—you have to work at it. And to maximize your effectiveness you need to understand the bird's biology, and then apply that understanding to finding birds.

A brief discourse on fluctuating populations may help. As a whole, North Carolina doesn't enjoy the vast dove populations of, say, Georgia or Texas, states where a large percentage of the nation's migrating doves congregates for the winter. However, Piedmont and eastern North Carolina are blessed with a plenitude of good dove habitat, attracting and holding both large resident breeding populations and a fair number of migrants from other states.

***Telephone lines may** hang heavy with birds in late August, but a substantial proportion of doves will migrate out of state after early September. Hunters need to refine their tactics to be successful with latter season birds.*

EUGENE HESTER

KEN TAYLOR

***Eddie Nickens tries*** *an incomer attracted to his decoy tree. Blinds, camouflage and decoys stack the odds in the hunter's corner, especially after Opening Day.*

Of course, one of the great mysteries of nature is the case of the disappearing dove. You all know what I'm talking about—telephone lines and trees that sag with doves in late August become barren of birds come September—sometimes, to great dismay, just before Opening Day. This penchant for mischief has bestowed upon the bird a reputation for possessing powers to foretell—and thus avoid—the havoc that awaits them Labor Day weekend.

***Truth is,*** the birds aren't supernaturally prescient, but their vanishing act in September isn't merely myth. Mourning doves seem more abundant in the last days of August because they *are* more abundant. Research has shown that during this time North Carolina's burgeoning resident and summer breeding populations are bolstered by early migrants from northern states. The state's population is at its highest in late August and then rapidly declines as a large number of the birds migrate out of state.

While the whiff of gunpowder no doubt helps speed many birds south, this migration is entirely inevitable, as witnessed by those sad, occasional years when many birds depart before Opening Day. Migration is apparently precipitated by those first cold fronts that typically sweep through North Carolina in late August or early September. According to research conducted in the 1950s, the dove population in North Carolina typically declines throughout September and doesn't bottom out until late October. The population then begins to increase in mid-November, as a second wave of migrants from northern states arrives. Usually the population climbs through December and January, although the number of doves in the state at any one time is greatly influenced by weather patterns to the north.

In mid-September the diminished shooting that results from this mass exodus is compounded by the peak of crop harvesting taking place at that time. Unlike Opening Day, when doves are concentrated in a few freshly harvested or planted fields, the state's remaining birds now have a multitude of feeding areas to choose from and scatter to accordingly. In all, the mass migration, scattered populations and *Zenaida*'s increased wariness can make even the best-planned late-season hunt "aft gang awry."

All the birds haven't disappeared, though and, yes, they still need to eat, drink and roost. Doves are exclusively seed and grain eaters and, unlike gallinaceous birds such as pheasant or quail, they shun ground cover, preferring clean, open ground with scattered seed available.

Concentrate on fields that provide this habitat. Chances are that most of the fields where hunting was great in the early days of September have nary a dove now. After finding lots of empty saddles at the evening roost, doves quickly discover that all's not well in fields full of men with black sticks and running dogs. So keep a lookout for fields that weren't harvested or hunted on Opening Day. They might be hot spots now. Doves also prefer recently harvested fields and will readily fly to where the combine tracks are fresh.

A good pair of binoculars will help you locate flocks, as does the spare time needed for scouting. Many of us, however, don't have the luxury of prehunt scouting time, or at least not much of it. Friendships with local farmers, therefore, should be assiduously cultivated.

One point to remember is that fields that have been good dove producers in past years are still likely to attract birds, provided that habitat and food requirements remain available. Some fields just seem to attract more doves than other apparently identical offerings. While the birds' choice of feeding grounds may seem capricious, there is usually some underlying habitat reason for it.

What to look for? Doves tend to prefer larger open fields over smaller areas surrounded by trees. Fields with nearby sources of water and grit hold an advantage. Doves also like to loaf in recent cutovers during midday and will feed on weed seed in regenerating vegetation. Fields with these attributes nearby will almost invariably have bigger populations than those without.

Like freshwater game fish, doves are structure oriented to some degree and will orient to and follow established flight paths around telephone lines and bare-limbed trees. Use this structure to your advantage by setting up your shooting station nearby along flight lanes.

Take some time to observe how and where the birds are flying. If you've found a flock of birds feeding in a field but haven't ascertained their flight pattern, look for the prominent structural characteristics that may influence their flight. One of the best areas to choose for a stand is near any type of gap in the tree line—for instance, where a dirt road enters a field or simply where two or three trees are considerably shorter than others. Field corners are another good bet. Doves heading out into a field to feed are often attracted to these gaps like iron filings to a magnet.

Doves also like to scan a feeding area for predators before they land to eat, so they are inevitably drawn to perches on power lines or trees in or along fields. Any field with a power line across it is worth investigating. (Be careful when shooting around power lines, however.) Doves will also follow hedgerows or lines of trees that reach into fields. Placing yourself on the end of these "runways" can be effective.

Of course, even if you've found the perfect field, you've still got to be there when the birds are flying. One of the biggest mistakes hunters make is not setting the alarm clock early enough. Morning hunting is almost always better than afternoon, particularly in the hot early season.

Of course, some years—last season, for instance—regulations prevent dove hunting during morning hours on Opening Day and throughout the September season. There is really no biological reason for disallowing dove hunting during the morning, aside from putting the brakes on potential illegal overharvest. The regulation, say biologists, is a people management tool to deter "double bagging"—the illegal shooting of more than one limit during the day. It goes without saying that if all hunters obeyed the regulations, morning hunting would not be an issue and we could all enjoy it. At *Wildlife in North Carolina*'s press time, shooting hours have just been set, so be sure to check regulations.

Because hunting pressure is so light during winter's second and third split seasons, morn-

JOE ALBEA

***Simple steps** like using natural cover and standing to shoot usually improve dove hunting success early on. Later in the season, more elaborate strategies may be needed.*

ing hunting isn't an issue and is allowed. The general rule is that the colder it is, the earlier doves fly from their roosts to feed because they need the energy to stave off the cold. My own observations tend to bear this out—in bitter weather doves will fly hard from about legal shooting time to about an hour later. On milder days, the birds may not fly until 8:30 or 9:00 a.m. If you get between a roosting spot and a winter feeding ground, you'll be rewarded by steady shooting.

***The use of*** decoys and, perhaps, dove calls is another tactic that comes into its own after the Opening Day crowds disappear. My friend Eddie Nickens, an avid dove chaser, pursues the birds in full camouflage and blinds, with silhouette and full-bodied decoys, portable dove trees and calls (see his article "Diehard for Doves," *Wildlife in North Carolina*, September 1991, for excellent decoying tips). I'm still not sold on the calling business, but decoys are deadly, especially in the December/January season. They are particularly effective in large fields when you are hunting alone and must attract birds into your killing zone.

Camouflage can also be a big help, though in early season you don't have to dress like a cornfield commando to kill birds. I usually forsake camo in September for olive drab and khaki, relying instead on keeping quiet and still and using natural cover provided by standing crops, weeds or tree lines (bring bug spray, though!). In December and January, however, when winter has decimated cover and the birds are ultra-wary, I'll go to camo jackets and pants and even, on occasion, matching face masks and blinds. Thus garbed, I've sat in an open stubble field without a blind and still had birds approach to gun range.

While this isn't the article for a dissertation on dove shooting technique, a few simple tips will improve your odds of bringing doves to the bag. Every year I see hunters sitting on their stools while shooting at doves that are hurtling overhead at 40 m.p.h. or better. There are gifted shots capable of consistent success from the sitting position, but I am not one, and judging from the curses I hear from folks shooting from stools, I'm not alone. Standing to shoot, even at the last moment, allows better balance and permits greater control over inherent hand/eye coordination.

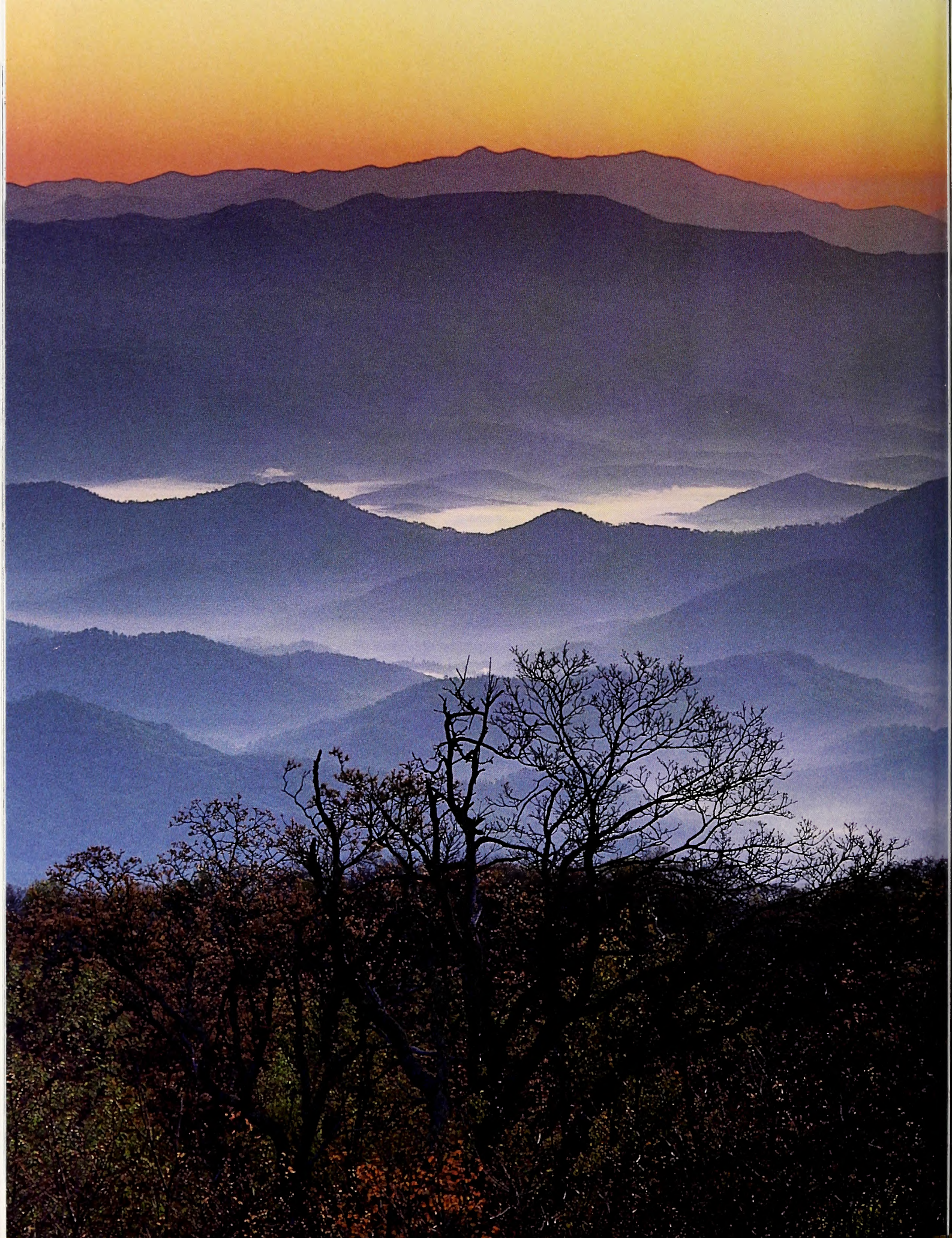
Another common mistake is overchoking. Too many shooters field guns that are choked too tightly for the game at hand. Unless the birds are being exceedingly difficult, or you are simply pass shooting high flyers in late winter flocks, you rarely need anything tighter than an improved cylinder with 12-, 16- or 20-gauge guns. For most of my shooting I use a skeet/skeet combination, changing screw-out chokes to a skeet/improved cylinder or improved cylinder/improved cylinder combo if the birds are rangy.

The qualifier for using open chokes is that you must shoot high-quality loads. Most of the promotional loads that hunters buy days before the season opener are made with cheap, inferior components and soft lead pellets that typically throw patchy patterns. Soft lead deforms under firing pressures, and misshapen pellets produce poor patterns. If you insist on shooting promo loads, then a modified choke may be appropriate, perhaps even full choke later in the season.

Fortunately, ammo companies have responded to hunter demand for better loads in recent years and now offer good small-game loads at reasonable prices. If you can't find quality small-game loads, good substitutes are "heavy" target or trap loads that throw hard shot at good velocities. The hard, high-antimony shot used in these loads produces superb patterns. I reload 1-ounce loads that deliver hard pellets at moderately high velocity with low recoil. High-antimony No. 8s are fine for early season, but I usually prefer an ounce of No. 7.5s for late-season birds.

Of course, the most important key to dove shooting technique is consistent practice, on real doves should you be so lucky, or on clay targets as an adequate substitute. This is hardly an original recommendation, but the recent emergence of numerous Sporting Clays ranges across the state has made practice more accessible, realistic and fun. Sporting Clays offers shooters clay targets that replicate—if not exactly duplicate—popular game bird species, including doves, from a variety of heights and angles. Try it.

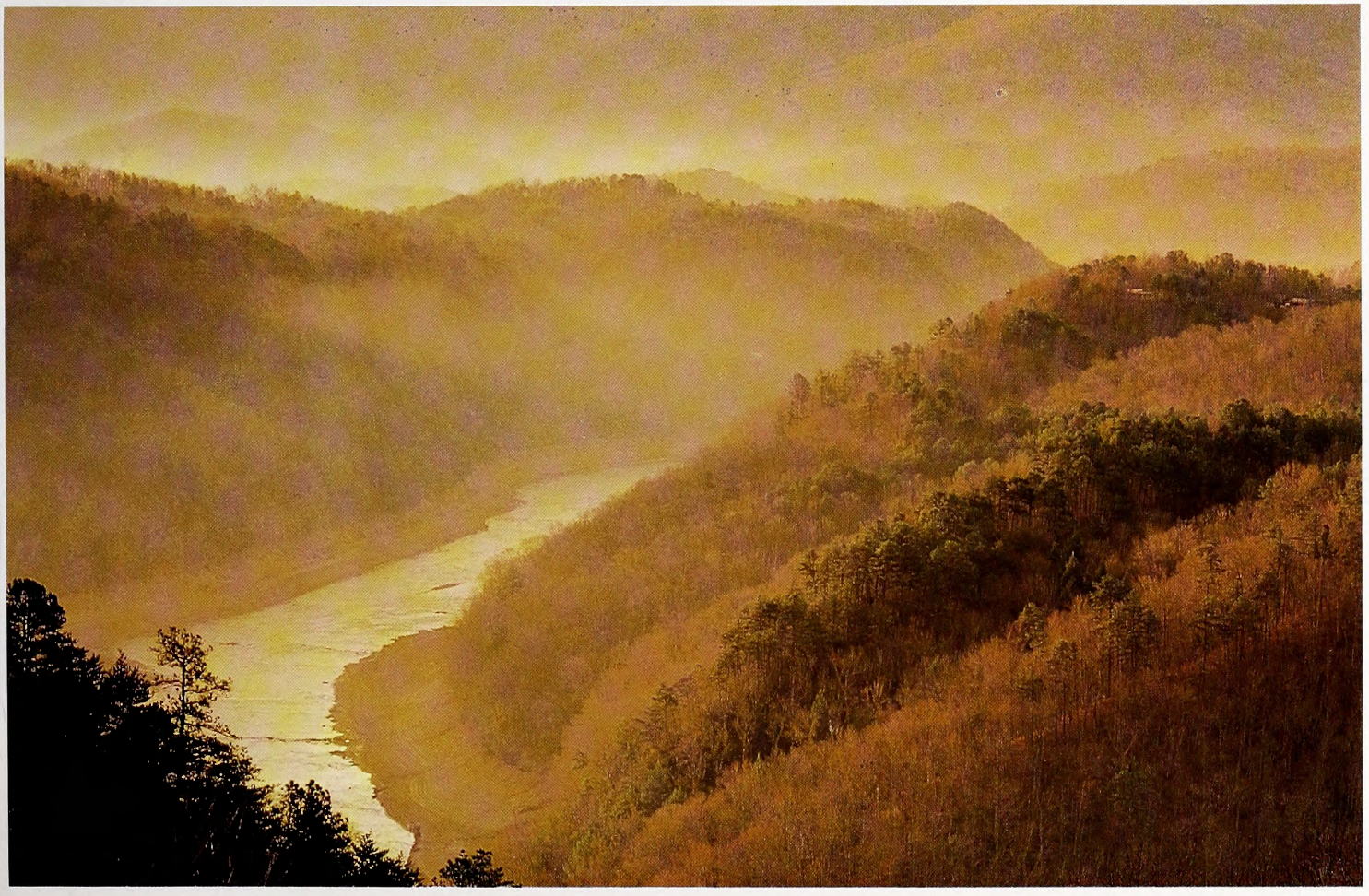
Now that you've found lots of doves and are hitting them consistently, remember to give the dove the respect it deserves by observing rules of fair chase. Any bird that makes you work so hard to bag it, after all, has earned it. ⊠



# MOUNTAINS IN THE MIST

What is so inviting about these ancient geological upheavings?
It must be the mist, that delicate, slanting light and the promise of fall color.

photographed by William S. Lea ©1994



*Great Smoky Mountains National Park across Fontana Lake*

*There are few places left where one can see the landscape exactly as it might have been seen by the earliest explorers of western North Carolina, yet the shrouded mountains from Wayah Bald hide all signs of our 200-year intrusion. It is easy to see why early visitors called these distant misty ridges across Fontana Lake the Smokies.*

*Sunrise from Wayah Bald tower*

*Pisgah National Forest from the Blue Ridge Parkway*

*Early morning unfurls its banner on peaks and ridges that poke through the mist in Pisgah National Forest. Soon will come the admiring hordes who annually visit to enjoy the brilliant colors. Some may arise early enough to enjoy a misty dawn like the one that cloaks all but the twinkle of lights in this valley.*

*Waynesville just before dawn*

# WORKERS of the WORLD

***Like a tribe of** little Trotskyites, the carpenter ant colony has no doubt been the model for idealistic social engineers everywhere. Here the queen is surrounded by her comrades, the workers, and their future comrades, the pupae.*

The carpenter ant is a tireless workaholic with a rigid social order. And you thought you were in a rut.

written and photographed by Harry Ellis ©1994

Many centuries ago in ancient Rome, Pliny the Elder, writing a book on natural history, described a species of giant ant living somewhere in the mountains of India that was, he wrote, "as large as an Egyptian wolf." He stated further that it frequently tore humans to pieces. Though Pliny had never seen the creatures himself, he relied for his information upon reports of returning travelers.

Tales of wolf-sized ants have long been discredited, but the common ants of my dooryard lead lives that are just as incredible as any of the fictitious ones, yet they actually *do* exist in overwhelming abundance. Here, in the miniature realm of the ants, we see almost unbelievable patterns of instinctive behavior and powers of foresight that in certain mysterious ways appear to transcend human intelligence. Within the realm of their instinctive acts, ants are among the cleverest of all wild creatures.

From the dawn of earliest recorded time, man has been intrigued by ants and their busy anthills. This most familiar and abundant of all insects early became a symbol of wisdom and industry, a model for mankind to emulate. "Go to the ant," said King Solomon. "Consider her ways and be wise."

All the world's ants belong to a single family, the Formicidae, and constitute one of the major groups in the order Hymenoptera, which also includes the bees and wasps. There are few places on earth where ants are not found. To date, approximately 8,800 species are known worldwide and 580 in North America, with new species being added every year. In the Great Smoky Mountains alone, more than 60 species have been recorded.

An ant colony is a cooperative society, consisting of a wingless caste of sterile female workers, a reproductive caste of winged males and winged virgin females, and a queen, whose duty, once the colony is established, is the laying of great quantities of eggs. In some genera of ants, there is a wingless soldier caste—large individuals with gigantic heads and awesome-looking mandibles that serve to guard the nest against intruders. The workers—usually thousands, sometimes a half million or more—enlarge and defend the nest, gather food, attend to the needs of the queen and the young, and, in case of danger, carry the eggs, larvae and pupae to safety. The sole duty of the males is to mate with the winged females, the potential queens that, after mating, establish new colonies. Individual worker ants often live from 5 to 7 years and queens for as long as 15 years. The ant colony itself is remarkably stable and may outlast a human generation.

Over eons of time, ants have built a complex and efficient civilization strangely resembling our own, welded together by instincts as old and as mysterious as life itself upon this planet. The anthill is a social structure to which all individuals are subordinated, where each ant follows its own almost undeviating, predestined role, with every gesture being made for the sake of the whole. An anthill is not just the milling horde of individual insects that it often seems to be, but a unit so perfectly organized that it functions as a sort of superorganism—almost as a single brain with a collective intelligence—moving about on a hundred thousand tiny legs. Almost no living creature is more different from ourselves than an individual ant; yet we are continually reminded of the almost uncanny similarities that exist in the societies of ants and men.

Ants live in vast, intricately constructed underground cities, with extensive roadways, galleries and chambers. They use teamwork in performing common tasks, divide their labor, fight wars with other tribes of ants and make raids on other species, carrying the stolen pupae to their own nests. The pupae will, after emerging from their cocoons, become willing slaves of the captors. There are harvester ants that gather and store seeds and grain for future use, and others, the farmers among the ants, that plant, cultivate and grow, in underground gardens, a mushroomlike fungus for food. There are also herdsmen, or dairying ants, that keep aphids for "cows," protect them, move them out to "pasture" and "milk" them for their sweet honeydew secretions; one species builds sheds, or "barns," over them. Almost no scientist believes that all these highly suggestive parallels are pure coincidence. Learned men are just now beginning to ask questions and search for answers as to what the reasons may be.

Instinct is, without question, the great dominating force in the life and behavior of ants, an impelling compulsion that must be totally obeyed. Intelligence, on the other hand, is something that is gained by experience. The question arises as to whether all ants' actions are governed by instinct alone, or does intelligence play a minor role in their lives? One myrmecologist—a specialist in the study of ants—has said that 99 percent of an ant's actions are purely instinctive and that only 1 percent can be credited to a very primitive type of reasoning or subintelligence. Researchers have shown that some ants have the ability to form and hold specific memory patterns. An ant can accurately return to the place where it recently discovered food, even though the location is a considerable distance away from the nest and its scent trail has been obliterated by researchers. Surprisingly, it still retains a memory of last year's feeding ground after a winter of hibernation. All of these

***Carpenter ants use** their powerful mandibles to carve decaying wood. Unlike termites, they don't actually consume wood, although their burrowing can be destructive to structures.*

activities seem more remarkable when we consider that the brain of an ant is no larger than the head of a pin. This caused one eminent scientist to remark that, "The brain of an ant is the most marvelous atom of matter in the world."

An extremely acute sense of smell, located in the antennae, plays an important role in holding the colony together. All ants produce chemical substances known as pheromones that give each colony a specific odor, provide individuals with the ability to distinguish friend from foe, nest mates from aliens and serve to guide them along difficult trails. Many species have well-developed compound eyes that are fully functional; others are totally blind, like the highly ingenious army ants of the American tropics. In the world of ants, so exceedingly sharp are the senses of smell, touch and taste that blindness is no serious handicap.

The amazing strength of ants has long been a source of wonder to human observers. An ant dragging a grasshopper or a butterfly many times its own size and weight is a common sight. It has been estimated that if an ant were as large as a man, it could lift a weight of 4 tons.

Ants would overrun the earth were it not for a legion of natural enemies such as birds and predatory insects, like ant lions, that hunt from pit-traps wherever ants abound.

Many ants do not sting and can only bite; other types, in addition to biting, can sting viciously, but relatively few ants are considered dangerous to people. High on the list of the earth's most dreaded creatures are the legendary army ants of the American tropics (*Eciton*) and their African cousins the diver ants (*Dorylus*). These fierce, predatory nomads stream through the woods, jungle and countryside in well-organized marching columns numbering many millions of individuals—a living river of ants—carrying their queen and young with them. Every creature unable to flee from them is covered and torn to pieces. While a healthy man could easily get out of their path, an injured person unable to move might become their prey.

At least two kinds of North American ants have dangerously violent stings and can cause harm to humans. These are the aggressive harvester ants of the American Southwest and the imported fire ants that are now firmly established in several southern states, including North Carolina. When a nest of fire ants is disturbed, they storm out in overwhelming numbers and attack with a vengeance. The victim may receive a hundred or more stings and, as a result, go into anaphylactic shock and die.

The woodlands of the southeastern United States, including the Great Smokies and the Blue Ridge, offer a variety of habitats to many different kinds of ants. Among our most common forms are several species of carpenter ants (*Camponotus*), our largest native ants. An abundance of fallen timber, rotting logs and dead standing trees in these areas affords an ample supply of nesting cavities, resulting in numerous and well-populated colonies of these wood-carving ants.

A few months ago in a woodland near my home, I came upon a large, thriving colony of black carpenter ants (*Camponotus pennsylvanicus*) in the decaying base of a live, standing maple. For several days afterward, I spent many daylight hours watching and photographing this busy ant metropolis and trying to learn something about the inhabitant's lives and behavior. Carved deep into the dying heartwood was a honeycomb of interconnecting galleries, passageways and nesting chambers, with a circular fringe of sawdust on the ground around the base.

In the Blue Ridge Mountains, where I live, two different species of these wood-carving ants are extremely abundant: the black carpenter ant (*Camponotus pennsylvanicus*) and the red carpenter ant (*Camponotus herculeanus*). As the names imply, the black carpenters are basically black, with some individuals showing brownish markings on the foreparts and legs. The red carpenters show much red in their coloration, especially the legs, thorax, waist and base of abdomen. The black species is more inclined to nest in dead standing trees, while the red usually selects stumps and logs in the early stages of decay. I have not found carpenter ants on the summits of our highest mountains or at elevations above 4,500 feet.

Unlike termites, carpenter ants do not eat wood, but with their powerful sickle-shaped mandibles they excavate homes and nurseries for themselves and their young. Though termites are sometimes called white ants, they belong to a different order of insects, the *Isoptera*, and annually do some 40 million dollars in damage to buildings in the United States. With the aid of protozoa living in their intestinal tracts, termites actually eat and digest the wood. Carpenter ants normally work in dead and dying trees, but they will occasionally invade the sound wood of living trees, to which they gain entrance through cracks, crevices and knotholes. Sometimes they tunnel into the structural timbers of buildings, and the damage can be quite severe, though usually much less than that caused by termites. The intricate carvings of carpenter ants are often separated by narrow pillars and partitions that bear an artistic resemblance to modern abstract sculpture, stalactites and stalagmites in a cavern or distant city skyscrapers.

A typical carpenter ant colony consists of a queen and several thousand workers. Though basically carnivorous, they actually feed on a variety of foods. As scavengers, they collect and bring to the nest huge quantities of dead insects; as predators, they bring fresh insect prey. They also consume considerable amounts of honeydew, making frequent trips to plants where aphids abound. Carpenter ants have well-developed eyes and, apparently, good vision. They cannot sting but defend themselves with their formidable mandibles.

All during the summer the colony grows and prospers, but—in all the colder regions—with the coming of winter the ant hordes

***In spring,*** *a reproductive caste of male and female winged ants (below) will swarm and mate. The spent males die quickly but impregnated females become potential queens. Like a shepherd, this black carpenter ant (bottom) watches over its "herd" of red aphids. The ants will later "milk" the aphids for their sweet secretions.*

cluster together in dense masses within their chambers and fall into the dormancy of hibernation, while winter winds roar outside. The tide of life has sunk to its lowest ebb of the year and marks the only interruption to the egg-laying duties of the queen. Remarkably resistant to cold, these ants are able to survive even when shrouded in ice crystals and frozen for long periods of time. But with the warmth of spring, they respond quickly and soon emerge from their wooden galleries. The forest floor is alive again with carpenter ants.

As spring advances and the population of the colony continues to increase, it will be noticed that, in addition to the hundreds of wingless workers, there are ants of a new and different kind in the nest—a reproductive caste of winged males and females waiting for the magic moment when they take to the air on their marriage flight. Then, on a certain day of sunshine, as though some mysterious, silent signal had swept over the land, winged ants, out of thousands of different nests, from over miles of the countryside, rise in the air almost simultaneously, swirling in clouds, merging and mating. Sometimes so many swarms take off at one time that the columns look like rising smoke.

After mating, they return to earth wherever the winds of chance may blow them. Their mission completed, the males soon die, but for the females—now queens—life is just beginning. From a single mating in the sky, each young queen is primed with enough sperm to last her for a long lifetime of egg laying. Soon after her return, the carpenter ant queen chews off her wings, carves out a little dark nesting chamber in a dead tree or log and seals herself in. Now a prisoner to the darkness, she hates the sunlight as much as she once loved it. After rearing her first brood to adulthood, she no longer takes part in the labors of the colony but from henceforth is a veritable egg-laying machine, with the sovereign distinction of a matriarch who has given rise to the birth of a new ant nation.

There is much about ants that remains an enigma, mysteries yet unsolved, some, perhaps, that the human mind may never solve. As J. Henri Fabre, the celebrated French entomologist, has so well said, "Human knowledge will be erased from the archives of the world before we possess the last word about even a gnat." ☐

*Populations Improve Dramatically*

## Bald Eagle May No Longer Be Endangered Species

*Written and Edited by Vic Venters*

This summer the U.S. Fish and Wildlife Service announced a proposal to remove the bald eagle from the federal Endangered Species List. The bird, our nation's symbol, would instead be reclassified as threatened. Under the current Endangered Species Act, an endangered species is one that is likely to become extinct, while a threatened species is one that is likely to become endangered. The threatened listing has been recommended because the bald eagle population, while greatly improved, has not yet fully recovered.

The bald eagle is currently listed as endangered in all the lower 48 states except Michigan, Minnesota, Oregon and Washington. The population is considered healthy in Alaska and is unlisted.

The change in listing for most of the lower 48 is being proposed because the bird's population has improved to such a degree that it is no longer in danger of extinction. Since 1984, bald eagle populations in the lower 48 states have grown from 1,757 pairs to more than 4,000 pairs. In addition, biologists estimate there are about 5,000 to 6,000 juvenile bald eagles in the lower 48. Biologists credit the recovery to the reduction in chemical contaminants such as DDT in the environment, reduced illegal shooting and a reduction in secondary poisoning.

Historically, bald eagles nested throughout most of North America, including 45 of the lower 48 states. North Carolina has a small breeding population of bald eagles—about 10 pairs—although a substantial number of birds winter in or migrate through the state each year.

NEAL MISHLER

***Because of expanding** populations, the U.S. Fish and Wildlife Service recently proposed removing the bald eagle from the federal Endangered Species List in most of the lower 48 states.*

Bald eagles will remain on the Endangered Species List in the Southwest, primarily in Arizona and New Mexico, an area where the population remains small—about 30 breeding pairs—isolated and vulnerable.

Even with the proposed change, the bald eagle remains the most protected bird in North America, with protection afforded by several treaties and laws. For example, the maximum fine for the illegal killing, possession or sale of a bald eagle can run as high as $500,000, and the violator can be sentenced to up to five years in prison for each offense. Animals that are threatened are given the same level of protection as those that are endangered. A decision by the U.S. Fish and Wildlife Service on this proposal is expected to take place within a year.

*This Season Should Be Good*

## Big Game Harvest Data Looks Promising

North Carolina hunters harvested 134,452 whitetailed deer last season, and Scott Osborne, the N.C. Wildlife Resources Commission's big-game project leader, is predicting similar results for the upcoming season. "Harvest for the 1994-95 season should be consistent with last year's success based on what we have seen regarding the condition of deer and reproduction over the summer," Osborne said.

Of last year's reported total, 76,393 were antlered bucks, 11,019 were button bucks and 47,040 were does. (See the feature article "What's Good for Buck," in this issue for more information on management and harvest strategies.)

North Carolina hunters also took 825 black bears statewide last year. Of this number, 301 were taken in the mountain region and 524 in the Coastal Plain. The wild boar harvest reached 44, all from the mountain region. Of this number, 30 were males, while 14 were sows. The 1994 spring season for wild turkey produced a record harvest of about 2,300 birds—up from 2,073 birds in the 1993 spring season.

For a more detailed breakdown of big-game harvest figures, see the newly redesigned *1994-95 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. Big-game harvest data are broken down by county and sex ratios, with additional information on hunting season success provided for whitetail harvest.

For the upcoming 1994-95 hunting season, deer, bear and wild boar hunters have the options of either reporting harvest to wildlife cooperator agents or reporting harvest via the new toll-free number 1-800-1-GOT-ONE. Successful sportsmen should report their harvest using one or the other of the options, but not both.

During next year's spring gobbler season for wild turkey, sportsmen will be required to report harvested turkeys using only the toll-free number. The telephone option will save money and will provide biologists and sportsmen with more timely harvest information.

*Many Species Now in Use*

## Wildlife Commission Leads the Way in Robotic Decoy Use

Is that a real deer standing in that field? Only the decoy doctor knows for sure. North Carolina's "decoy doctor" is Sgt. Tony Robinson, and he was a featured guest speaker at a recent North American Wildlife Enforcement Officers Association decoy workshop held in Lamar, Pennsylvania.

Sgt. Robinson of District 8 gave fellow enforcement officers a presentation complete with videos that showed how to effectively build and use robots in wildlife law enforcement. About 140 wildlife enforcement officers from 34 state and Canadian agencies attended the three-day workshop. Since the late 1980s and early 1990s, wildlife law enforcement agencies have increasingly been using wildlife decoys in enforcement work.

Robinson has been called the Wildlife Commission's decoy doctor because of his extensive work in developing robotic wildlife decoys. The decoys are usually made using taxidermy mounts with radio-controlled motors that allow heads and tails to move or ears to wag. Some even give the impression of an animal walking. Since being adopted by the N.C. Wildlife Resources Commission in 1990, these decoys have proven extremely effective in nabbing—and now deterring—night deer poachers and other chronic wildlife violators.

Robinson's first decoys were deer, but he has since developed robotic decoys of black bears, grouse, hawks, owls, otters and a groundhog. He is currently working on what he calls a "surprise," due to be unveiled this fall. Chances are that it will be a success. Robinson estimates that he has made over 500 cases involving decoys in four seasons of work.

Many states are now using some sort of robotic decoys, according to Robinson, but he indicates that North Carolina ranks near or at the top. "I believe we have as good a decoy deer program as any in the country," he said. "Most states have a few radio-controlled decoys, but all of our districts have them." Robinson now makes the parts necessary to convert mounts to robotic decoys, and he recently conducted a decoy-building workshop for other North Carolina wildlife enforcement officers.

TONY ROBINSON

***Sgt. Tony Robinson** of District 8 has earned the unofficial title of "decoy doctor" for his extensive work in developing and perfecting the robotic wildlife decoys used in enforcement work. Here, he poses with a few of his creations.*

## The 1995 North Carolina Wildlife Calendar Is Here!

With such artwork as James A. Brooks' "The Crossing" (featured on the inside back cover), the North Carolina Wildlife Calendar is sure to sell out.

The works of James A. Brooks, Robert B. Dance, Robert C. Flowers, Jr., Bob Herr, Lee James, Cathy Kinlaw, Brooks Pearce, Duane Raver, Mel Steele and David Williams are featured in the 1995 Wildlife Calendar. Order yours today by returning the form below with your check or money order to 1995 Calendar, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

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CALO95

*Agencies Cooperate for Project*

# New Shooting Range Dedicated at Camp Millstone

A new shooting range at Camp Millstone near Ellerbe was recently dedicated. The new range includes combination skeet and trap ranges with concrete runways and automatic clay-target throwers in houses, a 100-yard rifle range with sheltered shooting positions and an archery range with storage buildings.

The shooting range will be used for the N.C. Hunter Education Program and for ongoing programs at Camp Millstone. It may also be home to North Carolina's annual hunter safety tournament. The official-sized facility will also allow various shooting groups to conduct training and competitive events at the site.

Camp Millstone is leased through the N.C. Wildlife Resources Commission from the state of North Carolina. The camp is operated by the 4-H program of the N.C. Cooperative Extension Service at N.C. State University. Classes and programs on conservation, wildlife management and ecological and environmental concerns are regularly taught to campers at Millstone. Each summer, over 1,000 boys and girls attend camp there.

The range was constructed with a combination of funds from private donations and the Wildlife Endowment Fund. A number of agencies and organizations contributed to the project. They include the N.C. Wildlife Resources Commission; the N.C. Cooperative Extension Service; the Impact Program of the N.C. Department of Corrections, which provided labor and construction help; and the 307th Construction Battalion of the army's 82nd Airborne Division, which helped with land clearing and construction.

KEN TAYLOR

KEN TAYLOR

***A new shooting range** was recently dedicated at Camp Millstone 4-H camp near Ellerbe. Officials at the dedication were (left to right): Ed Maxa, extension 4-H specialist; John Lentz, chairman of the N.C. Wildlife Resources Commission; Dr. Richard Phillips, associate director of the Cooperative Extension Service; Capt. Robert Webster, assistant superintendent of the Impact Program, Dept. of Corrections; and Gene Schutt, resident manager of Camp Millstone.*

## Calendar

On several occasions, events in this calendar have been changed without notice. Readers should always check with the contact listed before traveling to an event. Items for listing should be conservation oriented and should be sent four months in advance.

**Sept. 10-11**

The 13th annual Currituck Wildlife Festival will be held at the Currituck County High School in Barco. Highlights of the festival include wildlife art, wood carvings, photography, decoy carvers, exhibitions and contests. A duck-, goose- and swan-calling contest will also be held. Monies realized benefit the Currituck Wildlife Museum in Currituck. For more information, contact Nancy Bray at 919-232-3297 or 919-336-2787, or write the Currituck Wildlife Guild, P.O. Box 91, Shawboro, N.C. 27973.

*Looking for Nominees*

## Take Pride in North Carolina Awards

The N.C. Department of Environment, Health and Natural Resources is looking for nominees for its seventh annual Take Pride in North Carolina program. The Take Pride program is a statewide partnership dedicated to increasing the awareness of the importance of wise stewardship toward public and private lands and waters. The focus of the program is on grass-roots initiatives.

The awards program recognizes individuals or groups that conduct outstanding stewardship action and awareness efforts that protect and conserve natural resources. Activities solicited in this awards cycle must have been initiated, accomplished or ongoing in 1993 or 1994.

Nominations will be accepted in the following categories: constituent and civic associations, public/private partnerships, businesses and corporations, youth, media, educational institutions, individuals, agriculture/forestry, local governments, state government and federal government.

For application requests and nominations, contact Take Pride in North Carolina, Division of Parks and Recreation, P.O. Box 27687, Raleigh, N.C. 27611, (919) 733-4181.

TAKE PRIDE IN NORTH CAROLINA

## Hunting, Fishing Day Declared

Saturday, September 24 has been declared the 23rd annual National Hunting and Fishing Day. Each year, 50 governors and the president join in issuing official proclamations designating the fourth Saturday of September as a day of recognition for sportsmen and thanking them for their conservation achievements.

The event notes the major contributions made to wildlife conservation by sportsmen, including $1.7 billion raised for use in wildlife restoration programs for such species as white-tailed deer, elk, antelope, wild turkey and many others. Check your newspaper for events that local hunting or fishing clubs may hold.

### Field Notes

| | |
|---|---|
| Dove (first season)* | Sept. 3-Oct. 1 |
| Rails, Moorhens and Gallinules | Sept. 1-Nov. 9 |
| Resident Canada Geese (by permit only) | Sept. 16-Sept. 30 |
| Eastern Bow and Arrow Deer | Sept. 12-Oct. 8 |
| Central Bow and Arrow Deer | Sept. 12-Nov. 5 |
| Western Bow and Arrow Deer | Sept. 12-Oct. 8 |
| Northwestern Bow and Arrow Deer | Sept. 12-Nov. 12 |

**Shooting hours for the first dove season begin at noon on Opening Day and last through Sept. 10. Shooting hours begin from ½ hour before sunrise thereafter.*

A special permit is required to hunt Canada geese during this season. The season will apply to all areas of the state except the following: Bertie, Beaufort, Camden, Chowan, Currituck, Dare, Gates, Hertford, Hyde, Northampton (east of I-95), Pamlico, Pasquotank, Perquimans, Tyrrell and Washington counties. Permits are available from license agents in the area of the hunts.

For more information on bag limits of either sex and antlerless hunts, check the *1994-95 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*, with license agents or with the N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

*Set for Sept. 17*

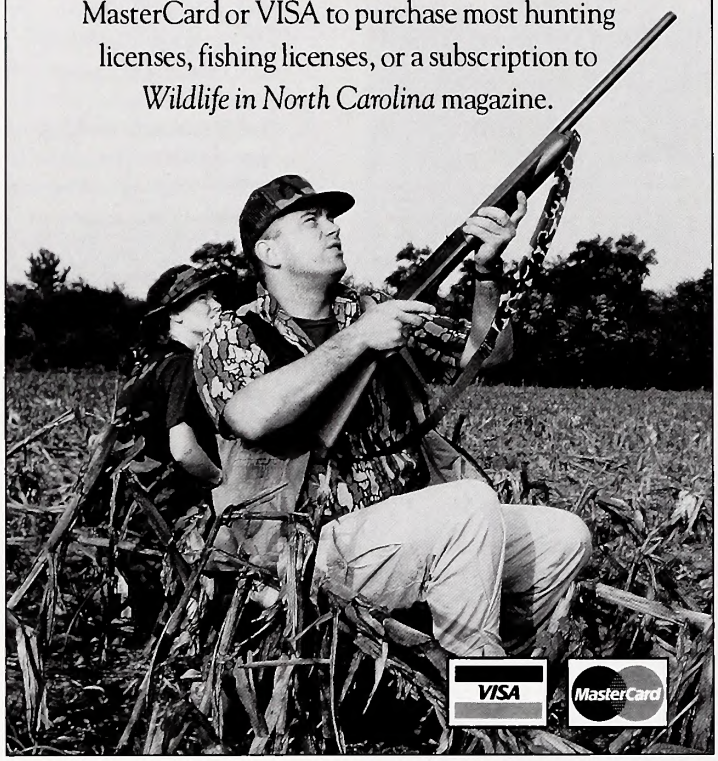
## Big Sweep Waterway Cleanup on the Way

MELISSA McGAW

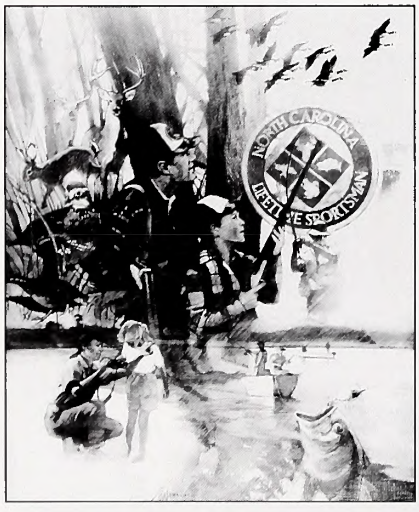
***The Big Sweep** annual waterway cleanup will be held across the state on Saturday, Sept. 17. Volunteers are needed to help pick up trash along beaches, lakes and streams across the state. For more information, contact the Big Sweep MCI Hotline at 1-800-27-SWEEP.*

*Only a phone call away . . .*

Call **919-715-4091** anytime and use your MasterCard or VISA to purchase most hunting licenses, fishing licenses, or a subscription to *Wildlife in North Carolina* magazine.




## Wildlife Endowment Fund Report




**June 1994**

Principal Balance
$19,650,523.66

Interest Earned
$14,179,938.54

Total Receipts
$33,830,462.20

Interest Used
$5,175,203.48

Fund Balance
$28,655,258.72

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.

# Tax Credits for Conservation

*by Vic Venters*

While today's tax structure is largely biased against the long-term preservation of open space and wildlife habitat by private individuals, there are some welcome exceptions. One of these is North Carolina's Conservation Tax Credit incentive program to assist landowners in protecting the environment, wildlife habitat and open space for the public.

A state income tax credit is allowed against individual and corporate income taxes when real property is donated for conservation purposes to a qualified recipient. Under the laws G.S. 105-151.12 and G.S. 105-130.34, the tax credit allowed is equal to 25 percent of the fair market value of the donated property interest, up to a maximum credit of $25,000. Any unused portion of credit may be carried forward for five succeeding years. The credit taken in any one year may not exceed the amount of income tax imposed by the state, reduced by the sum of any other credit.

Donations must serve a public benefit such as a public beach or water access, public trail access, fish and wildlife conservation or other similar land conservation purposes. Qualified recipients include: state agencies, including the N.C. Wildlife Resources Commission; local government and qualified non-profit organizations such as private land trusts that are incorporated to receive and administer land for conservation purposes and receive charitable contributions.

Property donations may include fee simple title transfers or conservation easements. Potential donors need certification by the Dept. of EHNR that their donations have conservation benefits. This involves filling out an application and sending supporting information to allow for review and site examination.

For more information or for an application, write the N.C. Conservation Tax Credit Program, c/o Office of Policy Development, Dept. of Environment, Health and Natural Resources, P.O. Box 27687, Raleigh, N.C. 27611, or call (919) 715-4191.

# The 1995 North Carolina Wildlife Calendar is here.

"The Crossing"
by James A. Brooks

James A. Brooks' painting of "The Crossing" is just a sample of the fine art featured in the 1994 North Carolina Wildlife Calendar. To order your calendar, see the convenient order form on page 29.

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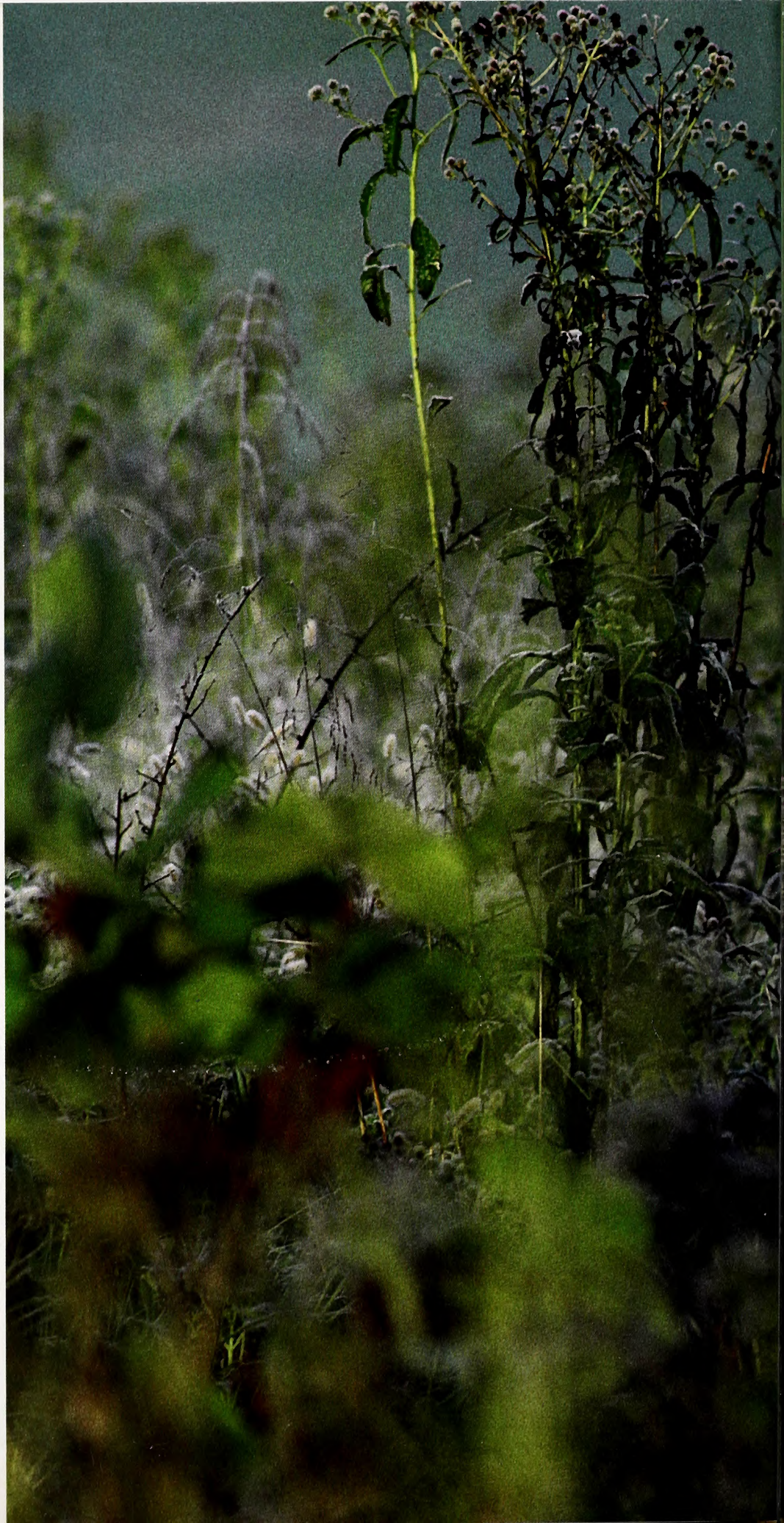

## Now Or Later?

Years ago when white-tailed deer were scarce, wildlife managers urged hunters to harvest bucks and pass up the does. Now that deer populations are the highest in history, hunters are encouraged to shoot more does and pass up some of the young bucks like this to let them reach trophy size. The result is a better balanced whitetail population—and bigger bucks.

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# WILDLIFE IN NORTH CAROLINA

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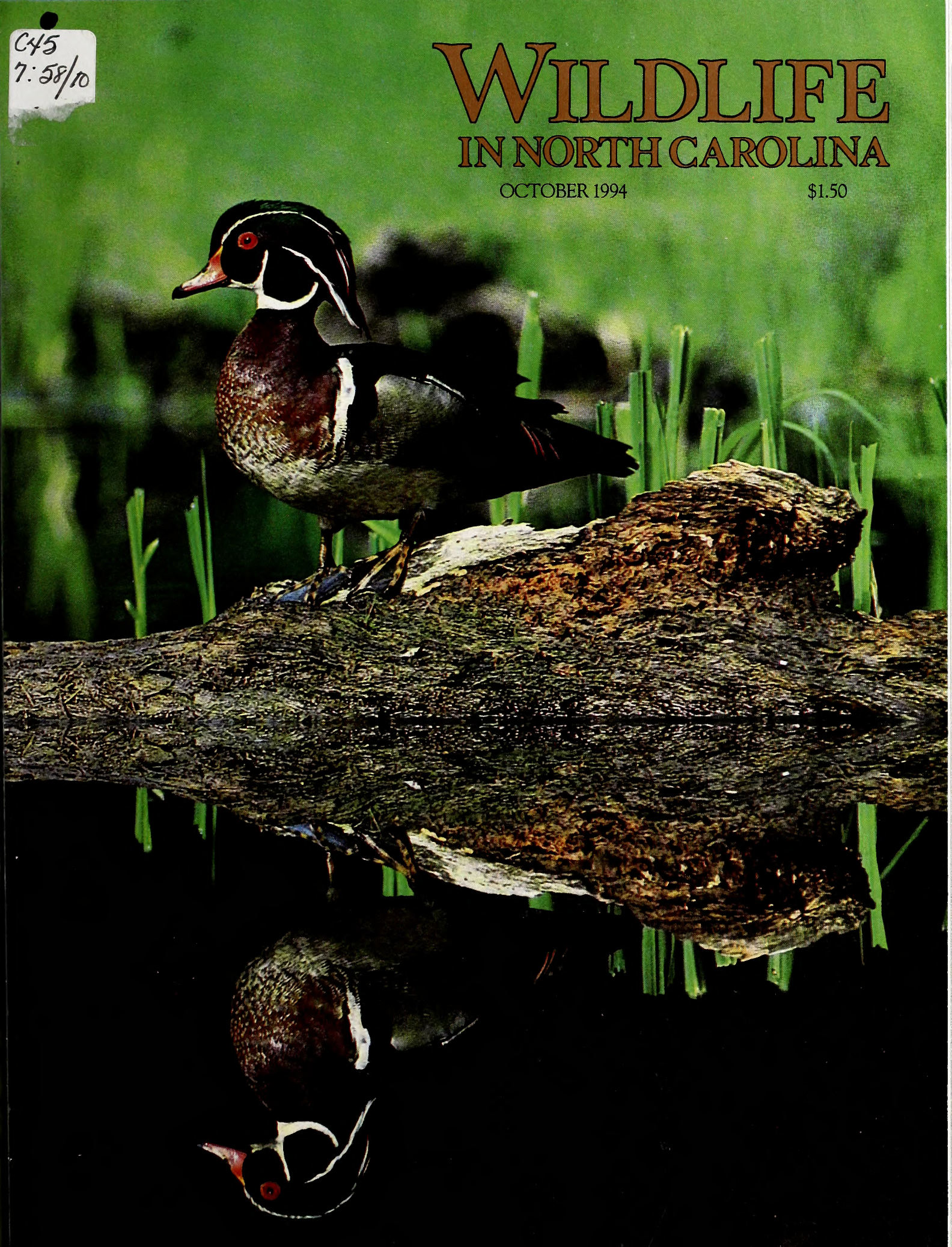

# A Brief History of Hats

*by Jim Dean*

There were several dozen straw hats hanging on the wall in the feed store, but one was different. It had a front brim of green plastic, a feature I hadn't seen in years. I paid the man $6.95 for it, stuck it on my head, and headed for the truck with a sack of fertilizer on my shoulder. I was barely out the door before I was whistling a straw hat song.

*"Blue skies, smiling at me,*
*Nothing but blue skies*
*Do I see..."*

All I needed was a cane pole and a can of worms. I knew where to find them.

For those who might not recall, a green-brimmed straw hat was the definitive unisex garden and angling chapeau of the 1940s and '50s, worn by everyone from grandmaws and great "aints" to field hands and gentlemen farmers. It instantly called to mind my ample grandmother picking beans or pulling corn in the hot sun or my grandfather sitting in a juniper boat under the cypress on Williams' Pond. They'd have been wearing such a hat. And so, for that matter, would every fair freckled maiden who ever posed for a calendar portrait with a wheat stem in her teeth.

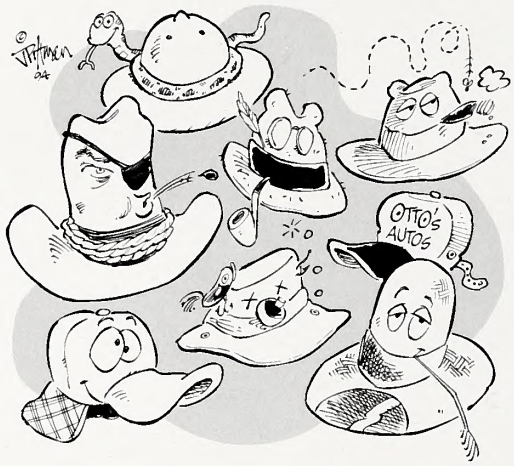


ILLUSTRATION BY JACKIE PITTMAN

Like most men with thinning thatch, I'm a sucker for a hat, but only hats that can go fishing or hunting. Truth is, I never wear a hat at any other time, although I have accumulated such an astonishing number and variety that I am obliged to consider myself an expert on the subject. In my opinion, a straw hat is still the nearly ideal casual fishing hat, but it's for contemplative fishermen of another era. Unless you tie it around your neck with 1,500-pound test parachute cord, you can't keep it on at 70 mph in a modern bass boat. Indeed, the changing nature of fishing has forced the retirement of other formerly practical fishing hats.

One of my earliest memories is of my dad fly fishing for black bass on the Little Alligator and Chowan rivers while wearing a brown, canvas-covered pith helmet. It was lightweight and provided both shade and cooling circulation. But more important, whenever Dad happened to flub a backcast in a brisk crosswind, the bass bug would simply bounce off the back of his helmet like a walnut falling on a tin roof.

Aside from the double-duty straw hat, people of my grandfather's generation seldom bought a hat purely for fishing. Instead, a dapper Sunday-go-to-meeting felt fedora would become a fishing hat whenever grandma said it was becoming too disreputable to wear anywhere else. I still have one of my grandfather's battered felt hats. He wore it because it kept the yellow flies from biting his bald head. You may have noticed that yellow flies (deer flies) like to land on your head, and you can beat yourself silly trying to swat them. However, an old felt hat that has been soaked in 6-12 insect repellent and flue-cured in the smoke of countless 5 cent Muriel Senators will discourage even the most determined yellow fly.

About 10 years ago while in an adventurous spirit, I bought an expensive raw wool Irish fishing hat, a type then in vogue. Although it was heavy and hot, I thought it gave me a certain "Je ne sais quoi." Turned out, I was right.

"You need to lose that miserable lid," a friend finally told me. "You look like a bad poet." That was too close to the truth so I took his advice.

Out West, you see a lot of fishermen wearing high-dollar beaver-felt Stetsons or those straw cowboy hats called "goat ropers." I thought I might cut a dashing figure fishing in a cowboy hat, but decided not to buy one after calculating the odds that I would be confused with Gabby Hayes or some vacationing Californian (a risky association in cow country). Besides, cowboy hats tend to blow off and float away unless you staple them to your head.

If you're not into high fashion, political statements or dude ranch role-playing, you've probably been wearing a cheap advertising freebie—one of those generic baseball caps. They shade your eyes and you can't beat the price. On the debit side, they won't shed a light drizzle, and even a good one will last only about a month. Besides, they don't offer your ears any protection from direct sun or indirect hooks.

In recent years—and against my better instincts—I have more or less settled on one of those Florida "Daffy Duck" bonefish caps with the long bills and fold-down rear flaps. They are reasonably aerodynamic, lightweight, shade your eyes nicely, and protect your ears and neck from the sun. Those made of Gortex will shed rain. Alas, they look ridiculous enough to provoke snickers even from other fishermen. And if you don't want a white one, you'll have to settle for purple, turquoise or some equally obnoxious color.

Actually, when it comes to fishing hats, I think I may have come full circle. My new straw with its green brim is virtually identical to the first fishing hat I ever owned. I thought that hat was perfect when I was eight years old, and it may still be.

Besides, I can't paddle 70 mph anyway.

October, 1994
Volume 58, Number 10

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*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

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## CONTENTS

4 **Sorcery for Big-League Bucks** *by Mike Gaddis* © 1994
*Your hunting territory has a hidden personality. Find it and foretell your success.*

8 **Remembering Hazel** *by Jay Barnes* © 1994
*October marks the 40th anniversary of the hurricane by which—here, at least—all others are measured.*

16 **Hunting Season Roundup, 1994-95**
*Here's a quick look at North Carolina's major upcoming hunting seasons.*

18 **Bands & Boxes** *by Vic Venters*
*Over 2,500 wood ducks were banded by wildlife biologists and volunteers in North Carolina last year as part of a new, multi-state management plan.*

24 **Bee Gums, Rabbit Gums & Mountain Toothbrushes**
*written and photographed by Doug Elliott* © 1994
*Time was when a rural mountain family could hardly get along without the versatile black gum tree.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*

**Nature's Ways** *by Lawrence S. Earley*

**Back of the Book** *by Vic Venters*

**Wildlife Through the Year** *by Vic Venters*

**Cover** *This handsome male wood duck is unaware that its image is mirrored in the swamp water. Photographed by F. Eugene Hester.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**

**Disjuncts can occur** *from north to south, east to west, and even from continent to continent. Balsam firs (1) were pushed southward down the Appalachian chain during the last ice age, but remained on the highest peaks of the Southern Appalachians after the climate warmed, eventually evolving into Fraser firs. North Carolina's magnolia (2) and tulip trees (4) are among many plant species related to magnolias and tulip trees in China. Longhorn beetles (family Cerambycidae) (3) in eastern Asia and eastern North America are strikingly similar. Biologists believe moles (5) once lived all across the continent, but were separated into eastern and western disjunct populations when growing aridity in the Plains expanded the range of prairie grasses.*

# Long-Lost Relatives

*written by Lawrence S. Earley/illustrated by David Williams*

On a cool, north-facing slope in Wake County, small bands of curious walkers stand on a boardwalk to gaze at a small grove of hemlock trees. They'd be hard-pressed to find another hemlock tree between this slope, called Hemlock Bluffs, and the lower elevations of our mountains. As a species, these trees prefer a cool and wet climate, not common in the Piedmont. Why are they growing here?

The not-so-mysterious hemlocks of Hemlock Bluffs are an example of a "disjunct," a small population of a plant or animal species separated from its main distribution. In the case of the Wake County hemlocks, botanists believe that during the last of several ice ages beginning about 18,000 years ago, hemlocks as well as many other plant and animal species extended their range southward as the weather cooled in front of the slowly advancing ice mass. Eventually, the tree spread throughout the North Carolina Piedmont and Coastal Plain, in advance of a boreal forest more typical of Michigan that included spruce trees and jack pines.

As the climate warmed, however, almost all hemlocks died out in the Coastal Plain and Piedmont. But at Hemlock Bluffs, a few hemlocks managed to find a congenial microhabitat on the cooler slopes.

The same frigid climate that pushed hemlocks south also nudged the balsam fir down the Appalachian chain. When the climate warmed, pockets of firs remained on mountain peaks, disconnected from the main populations in the north by warmer valleys. These isolated populations of balsam firs began to evolve differently from the main population, resulting in a new species, the Fraser fir.

No disjuncts are more fascinating than the plant families common to both the eastern United States and eastern Asia. If you walk through forested sections of China, for example, you'll see tulip trees, magnolias, oaks, maples, sweet gums, beeches—familiar trees, at least on the genus level, to anyone living in North Carolina. Indeed, there are only two species of tulip trees in the world, one in the eastern temperate forests of the United States and one in China.

One explanation of these far-flung disjuncts is that a continuous deciduous forest once covered the northern hemisphere from eastern Asia, across the Bering land bridge, and all the way to the southeastern United States. But a cooler climate caused conifer forests in the area of the Bering Sea to grow, breaking the wall of deciduous forest into two separate pieces containing similar descendants.

Another account ranges further back in time, when North America, Asia and Europe were connected in a single supercontinent. When the huge land mass splintered, each piece carried away a cargo of plants and animals that are distantly related.

Long-distance seed dispersal may explain some disjunct populations. Wright's cliff-brake fern (*Pellaea wrightiana*) grows in a few granite outcrops in Alexander and Stanley counties, nearly 1,000 miles from its main population in the Southwest. Could these two populations have been connected once? Probably not. Suitable habitats for the fern are rare between the Southwest and North Carolina, so botanists believe that spores blown here from the Southwest found hospitable accommodations in the exposed outcrops of these two counties.

The study of the distribution of plants and animals is called biogeography, and it's a fascinating—and speculative—look at how ancient events have shaped modern patterns.

***The hemlocks at** Hemlock Bluffs in Wake County are a good example of a disjunct, a small population of a plant or animal species separated from the main population. Many disjuncts have occurred when, over thousands of years, changing climate strands a plant or an animal in an isolated microhabitat that provides the temperatures and moisture regime the organism needs.*

*3. Longhorn beetle*

*4. Tulip tree*

# *Sorcery for* Big-League Bucks

## Your hunting territory has a hidden personality. Find it and foretell your success.

by Mike Gaddis ©1994

Invariably, it happens. Every year. I think I'm one step ahead when actually I'm a foot behind.

For the 1990 season, it was a diversionary tactic. The big deer feigned a late-October blitz in a known pre-rut staging area on the eastern perimeter of my hunting theater, drawing my concentration and reserves during prime time. Fresh sign, worn trails and my success during other seasons in that location duped me. There was just enough movement to be convincing, but meanwhile the main campaign with the big bucks was being waged on another corner of the farm. I finally figured it out and renewed my reconnaissance, as their commitment slackened in my zone of attention.

By logical elimination, it didn't take long to discover the actual locus of activity during the primary period of the rut. Indeed, it suddenly dawned so logical that my naivete would be the whipping boy of my alter-ego for months to come. The 4 square acres of low ground between a switch bottom and a cut-over appeared from a distance to be the aftermath of a beaver convention. Standing in any one spot, it seemed, it took both hands to count the slick, bare shins of the mutilated understory. Some of these rubs were waist high on 6-inch cedars, with deep brow tine gouges, and perimeter limb damage from lofty beam points. Stout saplings were battered and wrung off to the stump. There were scrapes worried out of the black leaf mold you couldn't have covered with the hood of a '53 Buick. The trails were as proliferate and stark as a Charlotte road map. Well, at least Rocky Mount. It was clearly obvious that this had been the scene of major rutting havoc involving some very respectable bucks. Problem was, I was two critical weeks late in working it out. By then, the rut was mostly over and the odds had shifted strongly to the deer.

Now, the clincher. Three weeks earlier, I had scouted this same low ground. It was virtually void of buck sign, and the does seemed to be concentrated at other feeding corridors. We all get bilked here and there. The key is to learn from it.

In Pender County, Terry McCumbee has a solid reputation for big deer and good ethics. He hunts the endless bays and flats of the Coastal Plain, where the homogeneity of the topography, numbers of deer and prolific sign present some unique twists on deciphering trophy buck patterns. Terry loves the challenge of bow hunting and continues to hunt predominantly with the bow through the regular gun season. Getting a good buck in bow range during the latter half of gun season is not easy. In fact, many gun hunters in that area regularly scoff at the idea, claiming that, "you can't kill a Pender County buck straight-up during gun season!" Consistently, Terry proves them wrong, "straight-up," taking mature bucks that turn heads and bespeak good sportsmanship.

"It's big, wet and flat down here," Terry says. "I'm in and out of water all the time. When you first start hunting it, everything looks the same. One bay after another, with an occasional hardwood flat . . . mostly pines if anything."

"There's a tremendous amount of deer sign, trails galore in the bog. It's so wet, they stand out like the veins on the back of your hand. You can pattern a fair bit by the travel routes. I look for to-and-from patterns, from bedding areas to feeding or staging sites, and pay close attention to the character of the tracks. Decent bucks generally travel laterally to heavy doe concentrations and leave less-distinct trails."

Terry sees a lot of bucks. He passed up around 16 last season of less-than-trophy standards.

"I look for big buck sign . . . heavy rubs and scrapes . . . to tell me there are good deer in the general area," he offers, "then I'll switch to the travel patterns off to the side, or in adjacent locations, and try to home in on his to-and-from strategy. I've killed some big deer a good ways away from any noticeable sign."

"In fact, I ended up with two nice bucks by accident on routes where there was hardly *any* sign. Each time, I was hunting large sign, and hadn't seen anything but small bucks in a couple of trips. Then I'd catch the big boys in the corner of my eye, slipping through the cover way off to the side. It's taught me a lot about deer movement in relation to big sign. So much of the big-time sign is made at night in places a respectable buck will avoid during the day."

I'm not sure anything Terry does is by accident, but we all get a break now and then by keeping our wits honed and thinking through the subtle probabilities. I can relate this to my experience during the 1992 season, when the heavy-duty, pre-rut rubs and scrape lines in my territory followed a meandering creek drainage. There was enough of the right stuff to put your heart in your throat every time you went in there. I hunted it as hard as I dared the last two weeks of bow season and the first two days of muzzle loading, rotating stand sites among strategic spots on the half-mile traverse. I was in deer, does and young bucks, even a nice two-year-old with a promising 6-point spread that checked by on two different mornings, but not one of the high-dollar salesmen who had left the flashy calling cards. Finally I pulled off because the timing was right somewhere, I knew, and I'd better be about getting there.

On the fourth day with the muzzleloader, I took an 18-inch 11-point, a super buck with a swashbuckling 4-inch drop tine. I had dropped back to a lock-on deer stand I had put up in late July on a pine-top ridge, roughly a quarter mile from the shopworn creek drainage. The area was practically devoid of huntable deer sign, relatively sparse of protective cover, and would have been summarily rejected by many hunters. I had passed it up myself, twice. But the right deer came through there that after-

***When this buck** grows bigger and a lot wiser, it is likely to use lightly traveled trails and may not even frequent areas that show heavy deer sign, at least not during legal hunting hours.*

F. EUGENE HESTER

***One of the keys*** *to taking larger bucks is hunting a piece of ground long enough to learn its "personality;" in other words, how deer use it during different times of the year. Some areas that hold trophy deer just before the rut may be barren of bucks during the breeding season.*

noon, on the heels of a solicitous doe, and it began to break on me that I needed to be a bit more open-minded in my strategic territorial assessment of what has trophy promise and what doesn't.

Since then, that bunch of high woods pines above the creek run that lies between two stagger-harvest cutovers has become one of my favorites. I turned my back on it for two years because it was so open and didn't really have funnel-zone character. But I have learned that, for whatever reasons, it has the "lay" big bucks favor, both during and outside the rut.

Teddy Roberts, my son-in-law, has a rock on the crest of a small rise that has anchored his deer hunting success for several years now. Each year Teddy forges out to scout and hunt new territory. And as regularly, the magnetism of "the Rock" draws him back to home base. He's taken a few good deer on other hunts, but when the going gets lean and his tail feathers are sodden, it's back to that ground stand over the big hump of fieldstone.

I fully expect him to grub it out one day with a backhoe and haul it home for enshrinement in the geometric center of the family living room. When my daughter complains, I'll remind her that it was she who went back on her own emphatic promise to "never marry anybody who hunts or fishes!" After all, she had fair warning growing up.

"Love has its limits," she'll retort. (I've been through this before.)

It's then I'll submit that she engineered the infamous turkey filibuster (the bill of rights for a boss gobbler mount in full strut over the mauve substrate of their restrictive double-wide was reported out unfavorably), that she can't expect to win them all, and that this time she's between a Rock and a hard place.

"I don't guess there's anything obvious about that rock," Teddy says. "It does back up to a swamp and it has a fair vantage over a ditch run of new-growth pines that cuts two laid-out fields. But I find more big sign at other places on the farm, and when I sit there I'm left with some big blind spots I could do without. All I know is the deer love it, and I see more bucks there than any other place I have ever hunted. When I've got to have a good buck, that's where I'll be."

He's made a believer out of me!

Now in my seventh season over the 2,000-plus acres of eastern Piedmont and threshold Coastal Plain that constitutes my own hunting range, I'm making similar discoveries. I'm gaining a better grasp of the topographical highways, and of its hidden character at different times of the seasons. In turn, I am becoming more adept in predicting and visualizing the future activities and whereabouts of its inhabitants, particularly deer, rather than reacting solely to the signs of the present. And perhaps the most important thing I

am learning is that it isn't necessary to have a wagon load of big sign in your immediate hunting area to reveal the presence of big deer.

Maybe I'm getting closer.

Last season—beginning to put some of this reckoning to work—I erected a stand prospectively in a bottomland glade I had neglected for several years. It strategically links a vast drainage, a woodlands thicket, and two cutovers, with cropland and oak ridges nearby. A sizable creek run snakes through its northern perimeter, within 40 feet of a fledgling pine plantation. Though the glade itself is only sparsely populated with a few mature poplars, gums and woods ferns and becomes rather cover depleted by November, in every other respect it has always had high promise for good bucks. A beautiful little amphitheater in the prismatic light of an October sunrise, it is quite alluring for that reason alone. But it never draws much sign in any part of the season, save a few light trails. In earlier hunts there I saw only does, spikes and fork horns.

I put a stand there in early August and frankly forgot about it through the first month of bow season. I was well occupied with some beanfield bucks on another farm and didn't think about it again until I was taking stock of my pre-rut options. The bucks were still largely bunched up in bachelor groups but beginning to show some interest in the transition. I decided on a change of scenery and debated the bottom glade. I could think of at least three other places that evoked greater confidence and almost rejected it completely. But the stand was conveniently in place and all I had to do was ease in and give it a try. The sheer beauty of the place under the colors of autumn deserved one morning's recompense. So, well before day on a Thursday in the second week of October, I tipped down the creek bed and felt my way up the lone maple and onto the Climax loc-on.

I spent a wonderful week there, a story in itself. The final sighting for the period before activity waned was ten bucks. Two monsters, an upper-class 8-point, four 6-pointers, two forkhorns and a spike. It took five years to put time and place together, but when it happened, it was spectacular!

Kenneth Conner hunts the western Piedmont. More than anyone I know, Kenneth has an uncanny ability to predict the location and travel patterns of big bucks. It comes from a quintessential symbiosis with his territory, from turning terrain into habitat, from melting into the mountains and foothills and becoming a part rather than a thing apart. Some men still have a capacity for "wildness," the "fifth essence" of an outdoors man. His perspective is enlightening.

"I hunted these hills for years before I really caught their rhythm," he relates. "When I first started, I hunted the heavy sign, the rubs and paws. Some of it would make your hair stand on end. I saw a few decent bucks that way, but not the big stuff—not consistently enough. One day, I was sitting over a scrape on a log trail. That log run was as raw and slick with fresh sign as any I've ever seen.

"About mid-morning, I happened to glance behind me and caught a momentary glimpse of my deer, the *right* deer, picking his way along the laurel halfway up the mountain. It was time to change tunes.

"Big deer travel the folds and wrinkles, the roll and pitch of the land that isn't that readily obvious. A big buck won't travel the same route every day; he'll mix it up. But over time, if you learn the land and put yourself on the path he's likely to take, he'll be by.

"A mature buck likes to move below the lay of the land. Any place that makes him visible for any distance on a level plane makes him awfully uncomfortable, and he'll avoid it during the light of day if he can. He'll try to walk just outside some line of cover if it's available, where he can jump to safety in a bounce or two.

"When the cover thickens on a bluff or the slope of a hollow, he'll stop, step just inside, and stand for a while watching his back trail, looking around for anything threatening. When he beds, he wants a spot with a little overlook, still under the elevation of the immediate area. He'll turn down any situation that doesn't offer at least two routes of escape, and he'll have alternate hideaways within a half mile or so. Near the rut, he'll lay where he can watch his does. I've eased along behind them in the snow, and the sign tells the story. You begin to gain some respect you didn't have before.

"When I began to put these things together, I would sit in the cabin for hours at a time, day after day, playing back my mental recollections of the land. I'd try to visualize the probable course a big deer would travel over the varying terrain. That's where I would invest my hunting time.

"Now," he concludes, "except to confirm that there's a good buck in the area, or for a clue to a travel route, I don't pay a lot of attention to rubs and paws. Most of it's made at night, anyhow, and deer move differently at night. The other thing I've learned is that some of the biggest deer leave very little sign. That's largely for the lesser bucks still on the proving grounds. When you're head bull, you get the run of the pasture!"

I keep distilling the common denominator in all this, looking for the element of strategy for planning of my fall whitetail efforts that will most significantly enhance chances for success. It seems to me that the tenets of recurring success in every outdoor pursuit are largely subtle. They don't come in a bottle with a neon label, or from a 3-D decoy mold, or with a three-year membership renewal package. Before you get to the estrus scent, the mock scrapes, the decoys, the grunt calls, the stand locations, and all other tools and tricks of the trade, you have to locate the deer. The right kind of deer. You have to put yourself where it is happening.

LLOYD B. HILL

***The best hunters** don't rely on technology and gadgets; their success comes from understanding the quarry and its habitat. Larger bucks are always a supreme test of hunting skills.*

It comes full circle to living and breathing your hunting ground. Maybe that's cliche and gets lost in all the hype and glitter of the technology, but it's far from worn out. And many who have hunted deer a long time get pulled off base by the promise of synthetic shortcuts to glory.

One of the keys, I believe, is hunting the same general terrain year after year, as long as it has trophy buck potential.

I'm convinced that every piece of whitetail territory has a latent personality, an ecological pulse beyond the obvious that both complements and foretells the instinctive life rhythm of major-league bucks. Listen to its "heartbeat" and you will find yourself in the company you seek. ☐

CLIFTON GUTHRIE

# *Remembering* HAZEL

## October marks the 40th anniversary of the hurricane by which—here, at least—all others are measured.

by Jay Barnes ©1994

When Hurricane Emily brushed the Outer Banks in August 1993, Hatteras Island residents suffered through some of the worst storm flooding seen in that region in many years. Homes were wrecked, tall pines were toppled and debris from the storm choked the narrow streets of villages from Hatteras to Rodanthe. It was the first severe hurricane to hit the North Carolina coast in many years, although it struck with only a glancing blow before rebounding out to sea.

Our recent standoff with Emily was just the latest in a long-endured conflict between North Carolina's coastal residents and tropical cyclones. Through the years, countless hurricanes have made landfall on our shores and tracked inland, battering the people and property of the state. Emily's unwelcomed visit served as a reminder that these storms continue to threaten, even though their occurrences may seem infrequent. In 1989 Hurricane Hugo rocked the western portions of the state after making landfall in South Carolina, and Diana delivered moderate damage to the southeastern counties in 1984. But fortunately, the last three decades have been relatively quiet ones for hurricanes along the Tar Heel coast.

There is one period in recent history, however, that offers evidence of our stormy past—the decade of the 1950s. While most of America was laughing at Milton Berle, rockin' with Elvis or worrying about Khrushchev and the bomb, the people of eastern North Carolina were grappling with hurricanes. Throughout history, these violent storms had visited with random frequency. But for a period in the mid-'50s, a flurry of hurricane activity dispelled all statistical expectations. Seven hurricanes blasted the Tar Heel State in roughly two years, leaving death and great destruction in their wake. The improbable frequency of these storms and their impact on the region earned a new nickname for our coast: Hurricane Alley. Included in this group was perhaps the most infamous of all North Carolina hurricanes, the "lady" known as Hazel.

NC ARCHIVES & HISTORY

***Although** Hurricane Hazel's eye passed nearly 100 miles west, extreme tides flooded parts of Morehead City, seen here (opposite page) looking west from the old Atlantic Beach Bridge. The storm surge, combined with abnormally high tides, destroyed many landmarks like The Breakers Hotel (above) in Carolina Beach.*

October 15, 1994, marks the 40th anniversary of Hurricane Hazel, a weather event that many North Carolinians still recall with passion and awe. This powerful storm was not just a coastal phenomenon—its course across the state is as well remembered in Smithfield and Rocky Mount as it is in Carolina Beach and Southport. For many, Hazel still remains the "standard" by which other storms affecting the region are judged. Other hurricanes may have killed more people or caused greater losses, but Hazel is considered by most to be the greatest natural disaster to ever affect the Tar Heel State.

Hazel began, like many other hurricanes, as a trough of low pressure over the warm waters of the tropical Atlantic Ocean. On October 5, 1954, the small storm was identified just east of Grenada and was observed on a west-northwest track that would take it through the Grenadines. Winds were clocked at 95 miles per hour, and the small island of Carriacou was the first to suffer from Hazel's winds and tides.

The growing storm continued to draw energy from the warm Caribbean waters and intensified as it curved northward toward Haiti. During the early morning hours of October 12, Hazel slammed into the Haitian coast, where several small towns were almost totally demolished by high winds and flooding. Heavy rains caused a massive land-slide that buried the mountain village of Berley, killing almost all of the town's 260 residents. It was estimated that as many as 1,000 Haitians may have died in the storm.

On the morning of October 13, Hazel moved through the Windward Passage on a course toward the Carolina coast. The eye of the hurricane passed about 95 miles east of Charleston, S.C., at 8 a.m. on October 15. About this same time, the outer fringes of the storm first touched the United States coastline near Myrtle Beach. Finally, between 9:30 and 10:00 a.m. Hazel's ominous eye swept inland very near the North Carolina-South Carolina border. It was there on the coast that the most awesome forces were unleashed, although the destruction continued as the hurricane barreled inland.

Hazel sped quickly across North Carolina. After tracking between Goldsboro and Ral-

CARTERET COUNTY NEWS TIMES

***Hazel's storm** surge reached 18 feet at Calabash in Brunswick County, and the surge combined with heavy rains and high water to cause extensive flooding even in many areas outside the direct path of the storm. Beaufort's Front Street was typical.*

eigh at about 1:30 p.m. on October 15, the storm moved through Warren County and into Virginia at about 2:30 p.m. At that time, the storm's barometric pressure had risen only to 28.50 inches, up less than one inch from its recorded low of 27.70 near Cape Fear.

Very few hurricanes in history had maintained their vigor the way Hazel did as it blasted through the interior sections of the northeastern states. As the storm raced northward at a forward speed of almost 50 mph, high winds near 100 mph continued to uproot trees, peel back roofs and snarl power lines. Flash floods swept away cars and homes in Virginia, Maryland, Delaware and Pennsylvania, where dozens of lives were lost. At approximately 10:00 p.m., just twelve hours after the hurricane made landfall on the Carolina coast, Hazel joined forces with a weak low pressure system near Buffalo, New York. Extremely heavy rains were dumped over western New York, and the effects of wind and water once again intensified.

As Hazel crossed Lake Ontario, it carried its rampage into Canada. Several locations reported wind gusts of 110 mph. More than 7 inches of rain turned the Humber River, which flows along the western edge of Toronto, into a torrent that washed away homes and automobiles. Scores of victims were trapped in the flash flood that swept through the Toronto area. Here, the tragedies continued as 78 more lives were lost and property damages were estimated at $100 million.

Hazel was last seen crossing the Arctic Circle on its way to Scandinavia, where it eventually fell apart. It had not lost its momentum and faded away as many storms do when they move over land. Instead, Hazel's destruction was spread over 2,000 miles on its northward trek from the Caribbean through North America.

In North Carolina, the aftermath of the storm was likened to the battlefields of Europe after World War II. Evidence of its violent winds stretched across the state, leaving residents with the task of cleaning up virtually every city street and country road east of Raleigh. The storm tide that swept over the southern beaches brought massive destruction and was by all accounts unparalleled in Tar Heel history. Robinson Beach, Ocean Isle, Holden Beach and Long Beach in Brunswick County were hardest hit. Virtually every home or structure was destroyed. Cottages were first battered by waves and 150-mph winds, then swept off their foundations by the rising tide and tossed several hundred yards into marsh thickets. Of the 357 cottages on Long Beach, 352 were washed away and destroyed.

Hazel's storm surge was the greatest in North Carolina's recorded history. The flood

U.S. ARMY CORPS OF ENGINEERS

U.S. ARMY CORPS OF ENGINEERS

***Before Hazel,*** *Long Beach was a pleasant family beach of 357 cottages (below). In this view of the same area after Hazel (left), an arrow marks the curve in the road as you enter the beach. Only five cottages were left on their foundations, all the rest having been been totally demolished, or swept back into the marshes behind the island by a complete washover.*

reached 18 feet above mean low water at Calabash and 17 feet at Long Beach. The incredible tide was made worse by a matter of pure coincidence: it struck at the exact time of the highest lunar tide of the year the full moon of October. Local hunters often refer to this as the *marsh hen tide*, a time when high waters allow them to flush rails out of the protective cover of marsh grass. Hazel's storm surge may have been boosted several feet by the unfortunate timing of its approach.

The coastal region where Hazel made landfall was also battered by some of the most destructive winds in North Carolina's history. Estimates of 150-mph extremes were reported from several locations, including Holden Beach, Calabash and Little River Inlet. Winds were estimated at 140 mph at Oak Island and 125 mph at Wrightsville Beach. As Hazel swept inland, its winds maintained their freakish intensity. Grannis Airport in Fayetteville reported gusts of 110 mph, and estimates of 120 mph were made by observers in Goldsboro, Kinston and Faison. Most incredibly, wind gusts near 100 mph were reported from numerous locations in Virginia, Maryland, Pennsylvania, Delaware, New Jersey and New York as Hazel sped through the Northeast.

In the aftermath of the storm, some sections of North Carolina's highways were littered with hundreds of trees per mile. Some were uprooted and tossed about, and others were snapped off 10 to 20 feet above

NC ARCHIVES & HISTORY

***Destruction at** Carolina Beach was especially heavy, and many cottages and long-time familiar landmarks were lost. In all, 362 buildings were completely destroyed with another 288 severely damaged.*

the ground. In Raleigh, it was reported that an average of two to three trees fell per block. Many fell on cars and homes, and power lines were left tangled and broken. Dozens of other cities and towns in the eastern half of the state faced similar losses.

Heavy rains fell from northeastern South Carolina through central North Carolina and Virginia. The greatest rainfall amounts were recorded on the western side of the storm track, and many eastern locations received as little as 1 inch. At least ten stations in North Carolina established new 24-hour records for rainfall. A U.S. Geological Survey rain gauge at Robbins, several miles north of Carthage in Moore County, measured 11.25 inches. Several locations in northern Virginia recorded more than 10 inches, and new rainfall records were established all along Hazel's northern course.

Hazel surprised coastal residents with its awesome display of wind and water. The *State Port Pilot* in Southport reported the story of two survivors who endured the worst of the storm: Connie and Jerry Helms. The couple had come to Long Beach for their honeymoon and were out roller-skating the night before Hazel struck. The Coast Guard warned other residents of the hurricane's approach, but the newlyweds arrived back at the beach too late to hear the warnings. They went to bed with no knowledge of the ominous storm that was poised off the coast.

The next morning at dawn, the couple awoke to the sound of pounding surf and chairs blowing about their porch. Huge waves began crashing over the dunes as they scrambled to leave their cottage. With no time even to pack their clothes, they jumped into their car, but it wouldn't start. They ran to their jeep, but it wouldn't start either. By this time, the surging ocean water was waist deep in the street, and they knew it was becoming deeper and rougher by the minute. They made their way to a nearby two-story house and broke through a door to get inside. As the tides con-

tinued to rise, the second floor buckled and the couple feared they might perish if the house collapsed.

"We started seeing houses exploding then floating away," Jerry Helms recalled. "Sometimes you could see the whole house flying through the air. There was a little cinderblock house next door, and a breaker went over top of the house, and after it went over it was gone. Stoves, refrigerators, and houses were flying through the air. Before we got out of the house we were in, we saw a guy standing in the doorway of another house floating by. He was found the next day buried in the sand."

The couple watched as the entire island went under water and every house within sight was swept away or pounded to splinters by massive waves. Large timbers, roof sections and appliances of every kind whisked past the cottage where they had taken refuge. Then, as the water swirled just inches below the second-story windows, the Helmses knew that their shelter was about to give in to the storm's waves and winds. Tying themselves together with a flannel blanket, the newlyweds escaped the collapsing house through a high window. Connie Helms, who could not swim, climbed onto a cotton mattress while her husband jumped into raging waters.

"We went right out to sea on that mattress," Jerry recalled. "By that time, all the two-story houses were covered by water, and most of the other stuff was already gone. But we never had a chance to think about what was happening or be scared. We were just trying to hold on to that blanket and stay alive."

Fortunately, the currents did not take the couple out to sea but instead carried them toward the leeward side of the island. To stabilize their makeshift liferaft, Jerry grabbed a section of a house that drifted by and positioned their mattress on top of it. A short time later, their raft became lodged in some treetops near Davis Canal. There the couple endured the storm for several more hours.

When the hurricane winds subsided and the floodwaters receded, the Helmses climbed down from the treetops. They made their way across Davis Canal—still clutching the blanket that had helped save their lives. The couple later found their way to Southport, where they visited Dosher Memorial Hospital for treatment.

The following day, Jerry Helms returned to Long Beach to search for the remains of the car, the jeep and the cottage. Both vehicles were buried deep in sand, and the only remaining fragment of the house was one corner, held in place by a single post. About a mile up the beach, he found his refrigerator, still intact with its door sealed. "The drinks in the refrigerator were still cold and the only thing broken was a bowl of peas, so we sat down and ate lunch out of it," he said. The honeymoon was over for the Helmses, but their incredible struggle for survival was not soon forgotten.

CAPE FEAR MUSEUM

***Along the ocean** front at Carolina Beach, many structures sustained such heavy damage that they were simply bulldozed. Even in 1954 dollars, the estimate of $17 million in damages at Carolina Beach alone is staggering.*

Several miles west of Long Beach, the resort of Ocean Isle was the scene of the single greatest tragedy Hazel brought to the Carolinas. The beach was connected to the mainland by a small ferry, which was destroyed in the early hours of the storm. Given no means of escape, eleven people gathered in one of the island's larger buildings. As the winds and waves increased, the building began to crumble, forcing the group to swim through breakers to a nearby truck. With the women and children inside, the men tried in vain to keep the vehicle upright as the tides continued to rise. Tragically, their efforts were no match for Hazel's fury and the truck was soon washed away. Only two survived. Thirty-three cottages that once stood on Ocean Isle were completely destroyed. Only two houses remained, and they were washed almost one mile across the island into the marsh.

In Southport, Hazel's storm tide forced ocean water through the mouth of the Cape Fear River, flooding the waterfront streets with a surge of 8 feet. All twenty of the town's shrimp houses and fuel docks were destroyed. Restaurants along the river and several warehouses were demolished. The storm tide lifted 35-ton shrimp trawlers over their docks and swept them into town, crushing cars and homes along the way. Along Bay Street, majestic old live oaks were toppled by winds of nearly 140 mph. For several blocks near the waterfront, large piles of debris filled the town's streets.

Lewis Hardee owned two trawlers and a shrimp packinghouse in Southport. As the storm reached its peak, his boats floated over their docks and his shrimp house was destroyed. Like many others in the small town, Hardee made his living on the water.

"Back then, nobody had insurance on boats in Southport," Hardee recalled. "Things were a mess. Boats were scattered all in the marsh from the Intercoastal Waterway to the Coast Guard Station. We all had a warning, but nobody knew it would be like it was."

Hardee had just rebuilt his shrimp house and dock the summer before Hazel arrived and tore them apart. A fire in the previous year had damaged the old structures, and his new pier and house had been built with costly cypress. Hazel's powerful winds and waves broke them to pieces and scattered their timbers along the shore.

"After the storm, I took a carpenter's crayon and went along the waterfront and put my name on every board," Hardee remembers. "You know they weren't hardly seasoned, they were new lumber, just a year old. All two-inch cypress decking. With that lumber I built another new fish house down at the yacht basin."

Farther up the river in Wilmington, the Cape Fear reached its highest level in recorded history. Flooding damaged numerous warehouses along the waterfront, and dozens of

ART NEWTON, STATE PORT PILOT

***Curious onlookers** gather along the flooded waterfront at Southport, but the worst was yet to come as docks were shattered and shrimp boats and recreational craft were swept into town where they became battering rams, damaging automobiles, homes and businesses.*

cars were submerged by the rising water. Overall damage to the city was not extensive and was limited mostly to broken storefront windows, uprooted trees and downed power lines. Wilmington was without electricity for three days. Two thousand residents were sheltered in 20 Red Cross evacuation centers around the city.

Carolina Beach was hit hard by Hazel, largely because the popular resort found itself in the hurricane's powerful northeast section. Property damage there totaled $17 million, much more than any other coastal community. The heaviest damages occurred along the oceanfront, where the storm's tidal surge bashed homes and the downtown amusement area. In all, 362 buildings were completely destroyed and another 288 suffered major damage.

A number of residents stayed on Carolina Beach through the hurricane and witnessed Hazel's attack on their town. They saw large waves roll through Mack's 5 & 10 store and watched as the steel pier collapsed and sank. Dozens of houses floated off their foundations and "crashed together like bumper cars."

Up the coast at Wrightsville Beach, Hazel's storm surge ruined dozens of large oceanfront cottages. Estimated at 12 feet above mean low water, the tide swept over the island, destroying 89 buildings and severely damaging another 155. Property losses were estimated at $7 million, including severe damage to the town's sewage plant.

After the storm, checkpoints were set up in key locations to prevent immediate access to the hard-hit barrier islands. Thousands of eager sightseers traveled to the coast to witness the destruction, but most were turned away. Looting was a severe problem, and on some beaches the National Guard was brought in to assist the police with protecting property. According to local news reports, some looters launched small boats and even swam across the waterways and made off with radios, stoves, refrigerators and cash.

At Topsail Beach, 210 of the 230 houses were destroyed and property damages were estimated at $2.5 million. The Topsail Island drawbridge was carried away by Hazel's furious winds and tides, and a Marine Corps amphibious vehicle was the only means of transport to the island for a period of days. Snead's Ferry and Swansboro suffered from extreme high tides, which deposited fishing boats and pleasure craft high and dry in streets and backyards.

In Carteret County, 120 miles north of where Hazel made landfall, residents witnessed the worst hurricane in many years. Hundreds of citizens took refuge in the Morehead City Town Hall and the county courthouse in Beaufort. In Atlantic Beach, Hazel's storm surge pounded the boardwalk area to rubble. Twenty-foot-high waves washed away a section of the Atlantic Beach Hotel. On the other end of the boardwalk, waves washed through the lobby of the Ocean King Hotel, undermining the structure. The old beach highway that connected Salter Path and Emerald Isle was swept away in two places. In these areas, Bogue Sound was connected with the ocean, but only briefly, until heavy equipment was brought in to fill in the overwash.

Though the Pamlico-Albemarle Sound region was on the eastern edge of Hazel's course through the state, numerous communities throughout the area suffered serious flooding. The Outer Banks north of Ocracoke were not severely affected, but towns like Washington and Belhaven saw extensive damage from rising tides. New Bern, Edenton and Elizabeth City also reported flooding. But across a wide portion of inland North Carolina, far from the effects of the tides, Hazel's powerful winds brought significant destruction to more than two dozen counties.

Although most of Hazel's fatalities in North Carolina occurred along the beaches of Brunswick County, several deaths resulted from the harrowing winds that sped across the state. In Wallace, a tobacco warehouse collapsed, crushing a Warsaw man beneath the rubble. In Parkton, a one-month-old infant was killed when a large tree fell through her home. The child's mother was seriously injured, as she had been lying next to her daughter in bed when the massive tree came crashing down. Other deaths occurred by electrocution, falls, and automobile accidents. Across North Carolina, hospital emergency rooms were filled with victims of the storm.

By most accounts, it was the most destructive hurricane in Tar Heel history. In North Carolina the toll was heavy: 19 people killed and over 200 injured; 15,000 homes and structures destroyed; 39,000 structures damaged; 30 counties with major damage; and an estimated $136 million in property losses. But when the hurricane's effects in North Carolina are combined with those in the other U.S. states, Canada and Haiti, the numbers climb: over 600 dead and an estimated $350 million in property damage. And, of course, those are 1954 dollars.

Much to the dismay of the people of eastern North Carolina, the active 1954 hurricane season that had spawned Carol, Edna, and Hazel was merely a prelude to the following season, when three more storms would strike the state. Hurricanes Connie, Diane and Ione all made landfall on the North Carolina coast within one frightening six-week period in August and September 1955. These three hurricanes together caused $170 million in property and agricultural damage to the state, eclipsing the record established by Hazel. With the combined losses from the 1954-55 storms, North Carolina faced an economic hardship of unprecedented proportions. Governor Luther H. Hodges testified before the U.S. Senate Appropriations Committee that these hurricanes had caused a loss of $326 million. That total exceeded the entire state's annual revenue for the year.

Significant changes have occurred on the Tar Heel coast since the "Hurricane Alley" days

ART NEWTON, STATE PORT PILOT

***After the 8-foot** storm surge receded along Southport's waterfront, shrimp boats were found stranded in town. The wind here was clocked at nearly 140 mph.*

of the 1950s. The extensive development that has overtaken many of our barrier islands has made North Carolina more vulnerable to hurricane damage than ever before. Building codes and practices have improved considerably, however, and newer structures should withstand the forces of the next great storm much better than those built during the '50s. But the next "big one" still has emergency planners and forecasters concerned.

"If you follow the track of Hazel today, you find a lot of new construction," says Dwayne Moore of the North Carolina Division of Emergency Management. "You have two nuclear power plants that were not there before, you have major military installations and the Port Authority; this is all new since Hazel, so those are extra considerations we have to keep in mind. If we had a hurricane of the same intensity to follow the Hazel path today, it would be catastrophic."

Moore agrees with those who say that the state is long overdue for a severe hurricane. "North Carolina has been very lucky over the years. Hugo was at one time expected to strike here, but of course it didn't, except for in the inland counties. And one day in the not-too-distant future, we will be hit by a Hugo or Andrew-type storm."

No one can say exactly when the North Carolina coast will be hit by the next great storm. Most people generally accept the risk, just as midwesterners accept tornadoes and Californians live with earthquakes. Common sense is the ultimate weapon against the hurricane threat, and well-prepared coastal residents know that lost property may be replaceable but that lives lost are lost forever. If a major hurricane threatens, their cars are packed and their plans secured to escape the approaching storm. They know it's not a matter of "if"—sooner or later the "big one" will come. ☒

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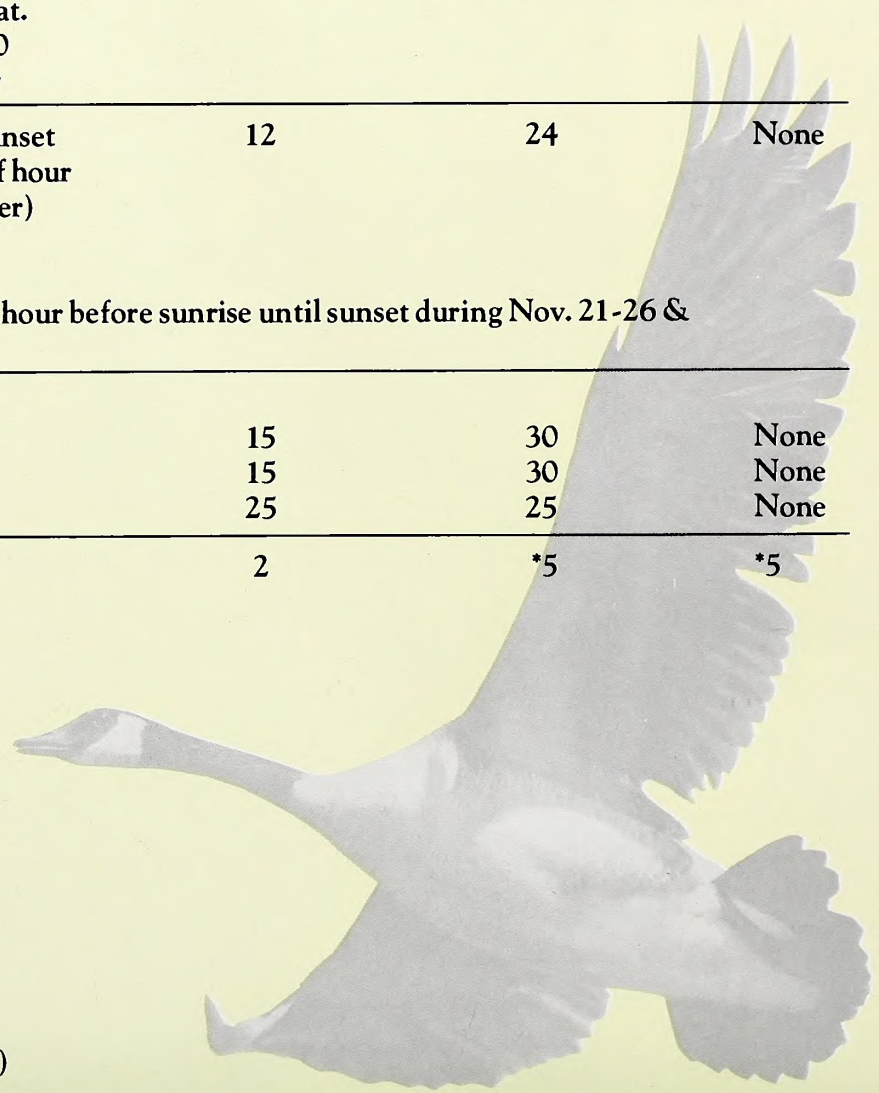
*Hurricane Hazel is one of the many powerful hurricanes to strike the North Carolina coast over the last few centuries. Jay Barnes has compiled a record of these storms in his new book* North Carolina's Hurricane History, *published by The University of North Carolina Press. It will be available in the spring of 1995, and will include hundreds of photographs, maps and illustrations, as well as historical accounts of more than 50 hurricanes. Mr. Barnes is director of the North Carolina Aquarium near Atlantic Beach.*

YEAR OF THE COAST

# North Carolina Hunting Seasons 1994-95

| Species | Hunting Season | Daily Limit | Possession | Season |
|---|---|---|---|---|
| Crow | Thurs., Fri., Sat. of each week from July 1 to Feb. 28 and Thurs., Fri., Sat. of each week from June 1 to June 30 plus Labor Day and Christmas Day | | No restriction | |
| Dove | Sept. 3-Oct. 1 (12 noon through sunset from Sept. 3 through 10; one-half hour before sunrise to sunset thereafter)<br>Nov. 21-Nov. 26 (all day)*<br>Dec. 12-Jan. 14 (all day)*<br>*Shooting hours are from one-half hour before sunrise until sunset during Nov. 21-26 & Dec. 12-Jan 14 seasons. | 12 | 24 | None |
| Rails, Moorhens and Gallinules | | | | |
| Moorhens and Gallinules | Sept. 1-Nov. 9 | 15 | 30 | None |
| Clapper Rail, King Rail | Sept. 1-Nov. 9 | 15 | 30 | None |
| Sora Rail, Virginia Rail | Sept. 1-Nov. 9 | 25 | 25 | None |
| Deer | | 2 | *5 | *5 |
| Bow and Arrow | Sept. 12-Oct. 8 (**Eastern)<br>Sept. 12-Oct. 8 and Oct. 17-Nov. 19 (**Western)<br>Sept. 12-Nov. 5 (**Central)<br>Sept. 12-Nov. 12 (Northwestern) | | | |
| Muzzleloading | Oct. 10-Oct. 15 (**Eastern)<br>Oct. 10-Oct. 15 (Western)<br>Nov. 7-Nov. 12 (**Central)<br>Nov. 14-Nov. 19 (Northwestern) | | | |
| Gun | Oct. 17-Jan. 2 (**Eastern)<br>Nov. 21-Dec. 10 (**Western)<br>Nov. 14-Jan. 2 (**Central)<br>Nov. 21-Dec. 10 (**Northwestern) | | | |
| Gun Either Sex and Special Either Sex | See *1994-95 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* | | | |
| Black Bear | See *Regulations Digest* | 1 | 1 | 1 |



| | | | | |
|---|---|---|---|---|
| | Dec. 12-Jan. 2 | 1 | 1 | 2 |
| Gray Squirrel | Oct. 17-Jan. 31 | ***8 | 16 | 75 |
| Fox Squirrel | Oct. 17-Dec. 31 (Only in 18 counties. Season closed elsewhere. See *Regulations Digest*) | ***1 | 2 | 10 |
| Common Snipe | Nov. 14-Feb. 28 | 8 | 16 | None |
| Quail | Nov. 19-Feb. 28 | 10 | 20 | None |
| Ruffed Grouse | Oct. 17-Feb. 28 | 3 | 6 | 30 |
| Raccoon and Opossum | ****Oct. 17 (sunrise)-Jan. 31<br>****Oct. 24 (sunrise)-Feb. 28 | No restriction on opossum. See *Regulations Digest* for bag limits on raccoon. | | |
| Rabbit | Nov. 19-Feb. 28 | 5 | 10 | 75 |
| Rabbit—Box Trapping | Nov. 19-Feb. 28 | | | |
| Pheasant—Nonnative Male Pheasant Only | Nov. 19-Feb. 1 | 3 | 6 | 30 |
| Woodcock | Dec. 8-Jan. 21 | 3 | 6 | None |
| Bobcat | ****Dec. 12-Jan. 31<br>****Dec. 12-Feb. 11 | No restriction | | |
| Fox | See *Regulations Digest* | | | |
| Groundhog | No closed season or bag limits. | | | |
| Coyote | No closed season or bag limits. | | | |
| Wild Turkey Bearded Turkey Only | ****April 8-May 6 | 1 | 2 | 2 |
| Resident Canada Geese (except certain counties in the northeast) | Sept. 16-Sept. 30 (permit required) | 3 | 6 | None |
| Migratory Waterfowl | Federal regulations may be obtained by contacting license agent or writing the N.C. Wildlife Resources Commission after October 1, 1994. | | | |

*One of which must be antlerless, Bonus Tag valid in some areas, see *Regulations Digest*.

** See *1994-95 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for approximate boundaries of Eastern, Central, Northwestern and Western deer seasons. For a copy of the *Digest*, write: N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

*** Total limit of 8 squirrels per day of which one can be a fox squirrel.

**** Season varies by county; see *1994-95 Regulations Digest*.

# Bands & Boxes

Over 2,500 wood ducks were banded by wildlife biologists and volunteers in North Carolina last year as part of a new, multi-state management plan.

by Vic Venters

Duck season has been closed for three months, but that doesn't stop Charles Cooper from hunting wood ducks in April. Known locally as the "Wood Duck Man of Albemarle," Charles sits in the bow of a camouflaged duck boat and peers intently at the back of a cove on Lake Tillery.

His friend, Mike Hinson, cuts the motor and the boat glides in toward a single wood duck box perched atop a cedar pole. As the boat slows, Mike picks up a pole and silently pushes the boat forward. Twenty feet from the box, Charlie springs into action. He grabs a golf ball retriever—not a gun—and quickly extends the telescopic aluminum pole. Tied on the end is a retrieving dummy about 3 inches in diameter.

He stands on the bow and extends the device toward the box and, with a practiced jab, shoves the dummy into the nesting box's entrance port. His dexterity is rewarded by a muffled *thump, thump, thump* from inside the box.

Charlie turns round to face us. "Bird," he says with a big grin. As Wildlife Commission biologist Ken Knight holds the pole in place to prevent the bird's escape, Charlie dismounts, wades to the box, and stuffs a burlap bag in the entrance. He then opens a side door on the box, thrusts his hand in, and pulls from it a wood duck hen, frightened to be sure, but none the worse for the experience. Ken quickly counts the eggs—14 in all—then points to the hen's leg. "Already banded," he says. "Probably one we got last year."

The band number is recorded and the hen is quickly placed back on its nest, the box door closed, and the burlap bag removed after letting the hen calm for a moment. We then retreat silently to the boat, paddle out of the cove, then crank up and roar off to pay more rude, but essential, visits to other wood duck nesting boxes scattered around lakes Badin and Tillery and Tuckertown Reservoir.

As it turned out, that hen was the first of 24 hens caught on that warm day in April. Nine had been banded before, and all of the "new" hens were subsequently banded as well. During the remainder of the breeding season, Ken, Charles and Mike monitored 136 wood duck boxes on the three Pee Dee River reservoirs, as well as in small ponds and beaver swamps in surrounding counties. During the summer, they caught 62 hens and banded 35, the remainder having been previously banded. Of the 136 boxes monitored, 99 showed some wood duck use while 81 boxes had hatches, producing an estimated 1,107 ducklings.

VIC VENTERS

Cooper's wood duck box, a cooperative effort between the Wildlife Commission and the Pee Dee River Basin Ducks Unlimited chapter, is going into its fourth year and is considered by biologist Ken Knight to be a model of what a volunteer wood duck nesting box project should be.

"Charles Cooper and the rest of the chapter volunteers really approach this project in the right way," explained Knight. "Anyone can go out and put up a large number of boxes and then ignore them. However, this chapter focuses on putting up a smaller number of *quality* boxes. Each and every box is protected by a cone-shaped predator guard—which is essential—and each is placed near good brood habitat to optimize survival chances for the hatchlings. The boxes are also well maintained through the year and intensively monitored during the breeding season."

In the northeastern Coastal Plain, District 1 Wildlife Commission biologists are also involved in a similar, though larger, banding effort. Last year, Commission biologists monitored about 200 nest boxes intensively—visiting each box three times. Another 200 boxes were visited once during the year. From these boxes 60 hens were banded, although many more were captured that had already been banded. Wildlife Commission biologists also captured almost 1,000 male and female wood ducks in separate preseason banding efforts using rocket nets and baited wire traps. Including the banding efforts by volunteers around the state and federal biologists at national wildlife refuges,

***The resurgence of** wood duck populations in the eastern United States is one of the major wildlife management success stories of the 20th century.*

almost 2,500 wood ducks were banded in the state last year.

North Carolina is joining other states in the Atlantic and Mississippi Flyway Councils in a major new wood duck management plan administered and coordinated by the U.S. Fish and Wildlife Service. The plan emphasizes using data gained from increased banding efforts throughout the wood duck's breeding range in the eastern United States. Leg banding—both of females on the nest and through preseason live trapping of adults—is being reemphasized on a national level. A standard data information form was developed about four years ago by the Fish and Wildlife Service that now allows biologists to better interpret banding results and returns from around the nation. Six subpopulation units have been identified, with North Carolina joining New Jersey, Delaware, Maryland, Virginia, West Virginia and South Carolina in the mid-Atlantic subpopulation management unit.

While banding is extremely important for managing all waterfowl, it is absolutely critical for wood duck management. Unlike prairie breeding species, wood ducks cannot be counted by traditional aerial surveys because of the dense forest canopy that blankets their nesting, brood rearing and living areas in the eastern United States. Biologists are, therefore, almost entirely dependent on analyzing banding data, and to a lesser degree wing returns, to estimate continental and local wood duck populations, annual survival rates, harvest rates by hunters and nesting productivity.

While state and federal biologists have been able to extrapolate much useful information from prior banding efforts, the lack of more extensive and consistent banding data has meant that the Fish and Wildlife Service and state wildlife agencies still cannot accurately estimate the size of the wood duck populations on continental, state or local levels.

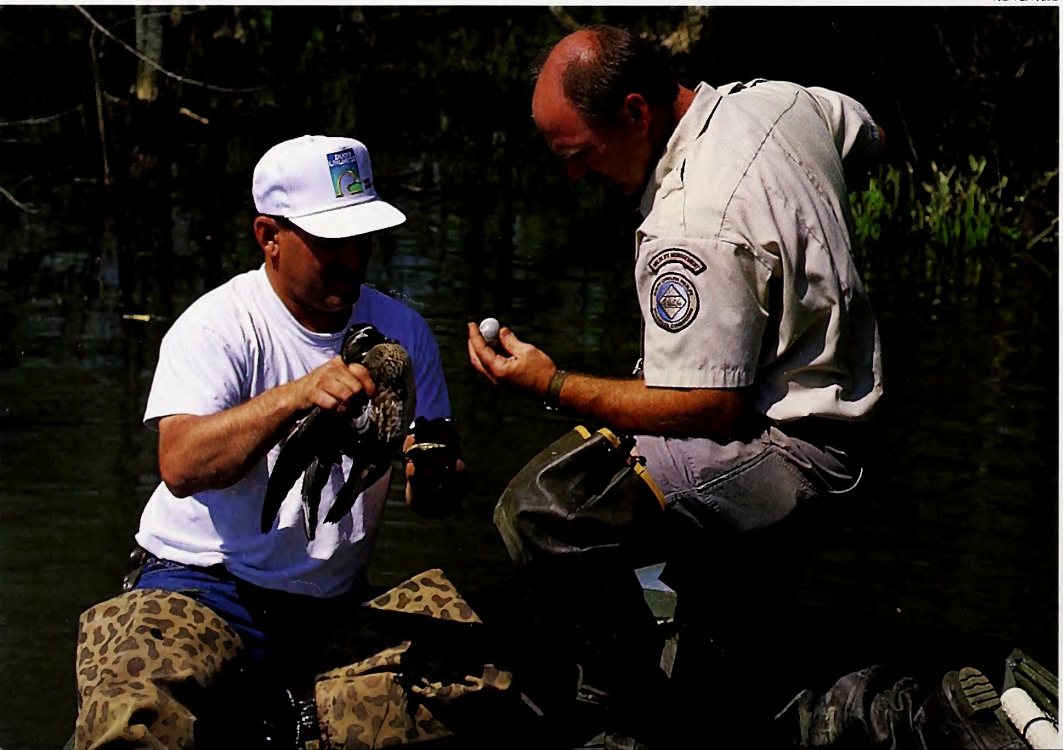
This has meant that the Fish and Wildlife Service has generally mandated a conservative approach in setting wood duck seasons and harvests, especially in the last five years. Without accurate population estimates, biologists must remain cautious when setting seasons and bag limits, particularly because wood duck populations appear more sensitive to hunting pressure than other duck species such as the mallard.

There are several reasons for this. For one, wood ducks show a strong propensity to return to local areas to breed—hence the high recapture rate of previously banded hens in Charles Cooper's nest boxes. Overshooting—particularly unethical and illegal roost shoots that kill many hens—can harm local populations.

When managing wood duck populations, biologists also have to work round a phenomenon known as *differential mortality*. While populations of wood ducks in southern states may well be able to stand longer seasons and liberal bag limits because they are essentially nonmigratory, wood ducks from the Northeast typically have to fly through a series of successive hunting seasons as they migrate south. Those birds are, therefore, exposed to far greater hunting mortality than southern-bred wood ducks that may be exposed to only one hunting season. That's why it is critical for biologists to learn when birds from northern states arrive in different areas of the South so that seasons can be set to minimize excessive mortality on northern birds.

In the absence of other reliable information, the Fish and Wildlife Service believes that a reemphasized banding program is the best way to get more accurate population and migration data, hence the new plan. In conjunction with the banding effort, the Service is also investigating whether nest box productivity can be used to gauge regional duckling production on a larger scale. To supplement the banding data, plans are also being developed to refine the roadside monitoring techniques used in the annual Breeding Bird Survey to better gauge wood duck populations in areas with heavy concentrations. If the new plan works, more of this essential information should be available to state and federal biologists that may allow refinements in management strategies in the future.

VIC VENTERS



Despite the caution, it should not be inferred that wood duck populations are in trouble today. On the contrary, wood duck populations appear to be quite healthy throughout their major breeding range. Today hunters enjoy excellent hunting for wood ducks across the nation thanks to one of the major wildlife management success stories of this century. In North Carolina, for instance, wood ducks comprised almost 28 percent of the duck harvest in 1992 and almost 32 percent in the 1993 season, well above the kill of

***Biologist Ken Knight** examines a wood duck egg as Ducks Unlimited volunteer Charles Cooper holds a previously banded wood duck hen. A new regional plan that emphasizes increased banding should allow state and federal biologists to gain better information about wood duck populations and survival rates.*

KEN TAYLOR

***Wood ducks show** a strong propensity to return each spring to the same area to breed, and it's not uncommon to capture banded hens year after year. Here an adult hen sits with her rapidly maturing brood.*

the second most common species—the mallard—at 18.4 percent of the total bag in 1992 and 22 percent in 1993.

Today's robust population is a far cry from the bird's turn-of-the-century brush with extinction. By 1900, wood duck populations had been decimated by the large-scale cutting and clearing of the duck's hardwood bottomland habitat, by the extirpation of pond-building beavers from many areas, and by two centuries of overshooting. Unlike prairie breeding ducks—which were afforded respite during spring and summer in their sparsely populated breeding grounds—wood ducks were shot year-round, by both unregulated recreational and by market hunters, who pursued the bird for meat and colorful plumage.

However, in the early years of the 20th century, ornithologists and concerned sportsmen like George Bird Grinnell, author and editor of *Forest & Stream* magazine, sounded the alarm. In 1901 Grinnel wrote, "Being shot at all seasons of the year [wood ducks] are becoming very scarce and are likely to be exterminated before long."

Fortunately for the wood duck, the federal government officially closed the wood duck season in 1913, although the prohibition wasn't enforced until the Migratory Bird Treaty Act became law in 1918. The wood duck was the only duck species upon which seasons were completely closed, and the total hunting ban lasted until 1941, when a handful of states were allowed one-duck bags for the species. It took another 20 years for the daily bag limit to be raised to two birds.

During this time, wood duck populations bounced back. By interpreting bands and wing returns, biologists have estimated that wood duck populations increased rapidly from the 1920s through the 1960s and '70s, slowed in the 1980s, and have leveled off in many areas since. Biologists give much credit to enforced shooting regulations, the gradual return of the beaver, and the maturing of second-growth bottomland hardwood forests. Another factor that has undoubtedly helped is the widespread placement of nest boxes.

Wood duck box management began in the 1930s with Frank Bellrose in Illinois and quickly spread to other states. From the 1950s to 1971, Gene Hester (whose photos illustrate this article) did much work to bring widespread box placement to North Carolina. Biologists today estimate that most wood ducks—perhaps 90 percent or more—are born in natural cavities. But there is no doubt that nest boxes have helped wood ducks recolonize areas and replenish local populations. And wood duck boxes have been and continue to be instrumental in banding and management efforts, since the birds are easier to capture and monitor in artificial boxes than they are in natural tree cavities.

The last decade has also yielded much new information about nest box placement. One extremely important recent finding has shown that wood duck "condos"—multiple boxes grouped together—are not conducive to improving populations and can even hurt breeding populations in some instances.

Boxes that are grouped together in sight of each other lead to the phenomenon called "dump nesting"; that is, the use of a single box by several hens. Dump nesting happens when two, three or more females lay eggs in a single nest box. While dump nesting can also occur sometimes in natural cavities or in well-spaced artificial boxes, the behavior appears most common in duck condos.

Multiple boxes located within sight of each other apparently attract a large number of females to a small area. Fierce competition for available nesting sites can result, and hens sometimes become confused over which boxes are "theirs." Biologists note an increase in "social pathologies"—nesting hens attacking each other, for example.

Nestling production often drops in boxes that have several egg "dumps" as the nest becomes overcrowded. Hens also tend to abandon these dump nests more frequently because of competition and strife. The result of all this is that hatchling productivity actually declines or, sometimes, ceases altogether—hardly the desired effect for those who take the trouble to build and place boxes.

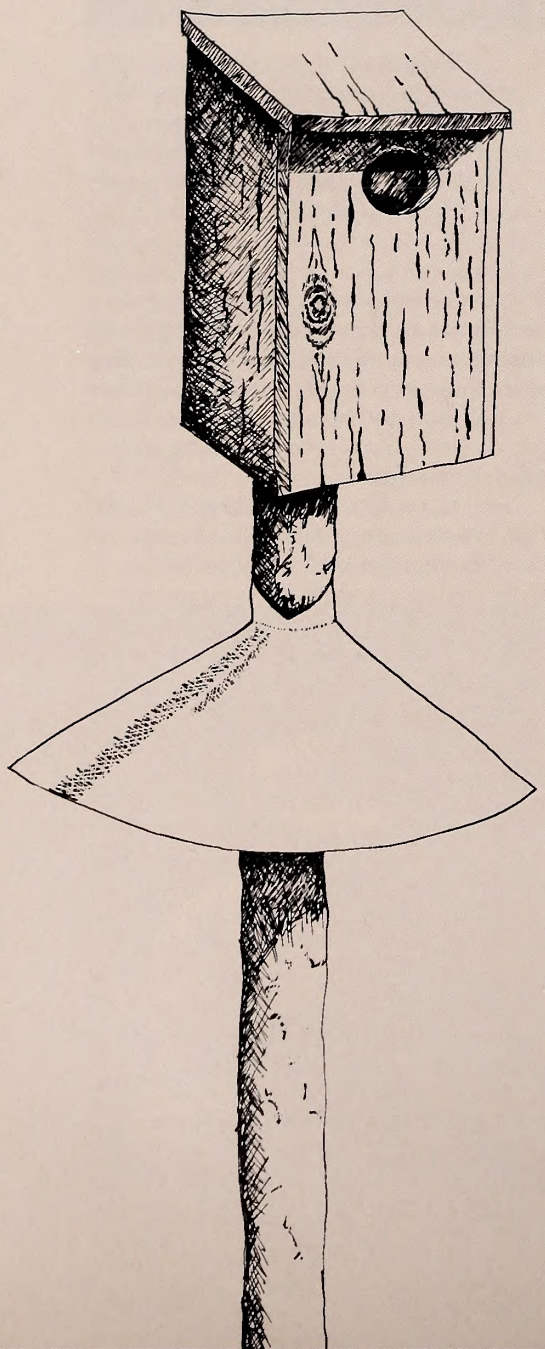
Biologists now urge individuals who want to put up boxes to place them individually or to locate boxes at least 100 yards apart in cover so that neighboring hens cannot see each other.

"We encourage individuals to put out nest boxes," said Dennis Luszcz, the Wildlife Commission's waterfowl project leader. "However, you should do it correctly. Always install a predator guard and place boxes out of sight of each other in good brood habitat."

Humans were responsible for wood duck declines; likewise, our stewardship over the last century has helped bring them back. If you want to lend a hand in the wood duck's comeback, see our wood duck plans on the following pages for help.

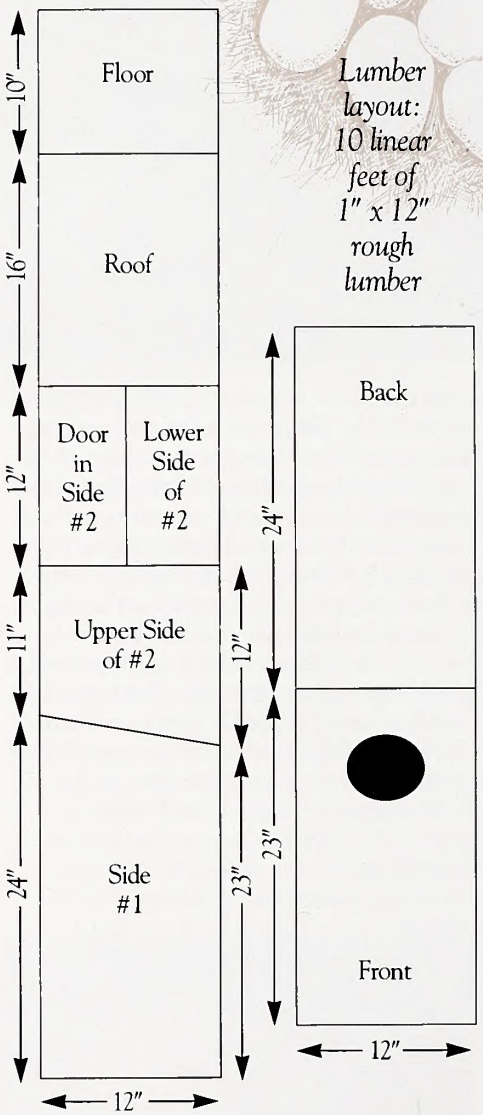
# Let's Build a Wood Duck Box

*The lack of suitable natural cavities is thought to be one of the most important factors limiting the continued growth of wood duck populations. You can help by constructing and placing wood duck boxes in suitable habitat where natural tree cavities may not exist.*



## Materials

**Wood:** 10 linear feet of 1-inch-x-12-inch rough-cut cedar or cypress lumber
**Nails:** 25 size 8- or 10-penny zinc-coated
**One lag bolt:** 4 inches or longer
**Hinge:** 1, with 3-inch cabinet screws
**Hardware cloth:** 18-inch strip at least 3 inches wide (sharp ends bent under)
**One post:** 4-inch-x-4-inch, up to 16 feet long (should be cypress, cedar or treated wood)
**Wood shavings or Chips:** enough to form a 3-inch nest base in each box




*Lumber layout: 10 linear feet of 1" x 12" rough lumber*

## When?

*Wood duck pair formation begins as early as October, and the ducks begin searching for nest sites in winter. Therefore you should install boxes by the end of December. Nesting begins in early spring and peaks in North Carolina in April and May but continues through July.*

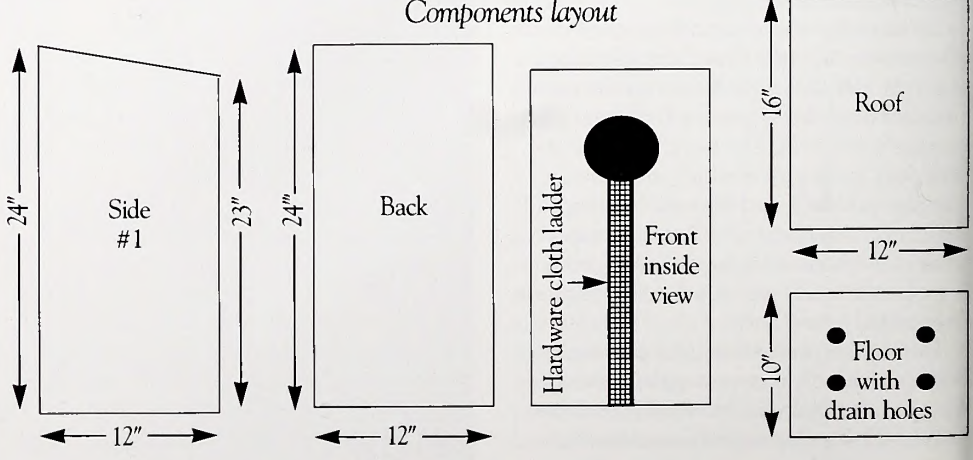
## Where?

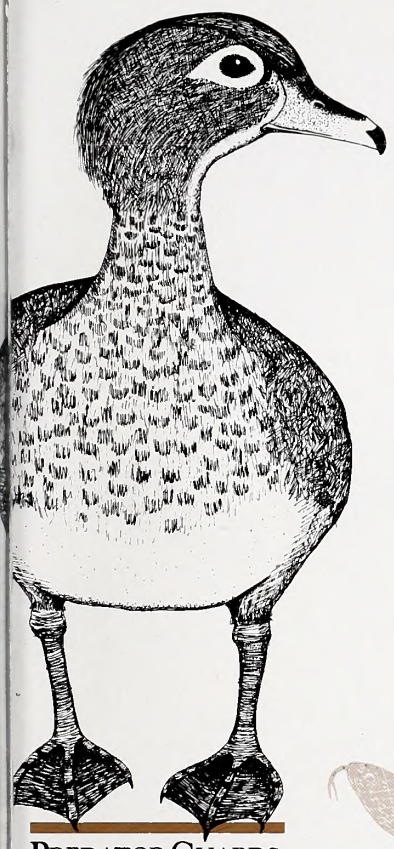
*Boxes may be placed in ponds, impoundments, beaver ponds, swamps or secluded coves on larger lakes. To prevent dump nesting, place wood duck boxes at least 100 to 200 yards apart, with boxes visually isolated from each other. Always place boxes near good brood habitat to maximize hatchling survival. Boxes should be placed at least 5 feet above water level and tilted slightly forward to allow hatchlings to crawl up the wall and escape. Never tilt boxes backward as this can prevent their escape.*

## Brood Habitat

*Good brood habitat consists of shallow, slow-moving or still water with plenty of nearby emergent aquatic vegetation and overhanging cover from trees or bushes near the water. This will provide protection, particularly from avian predators. Water should be present from February through July.*

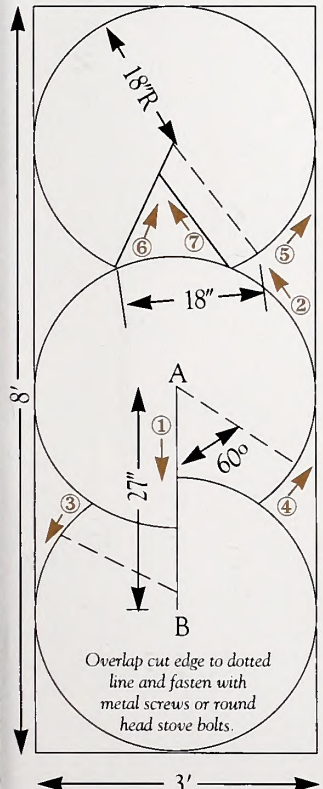
*Components layout*



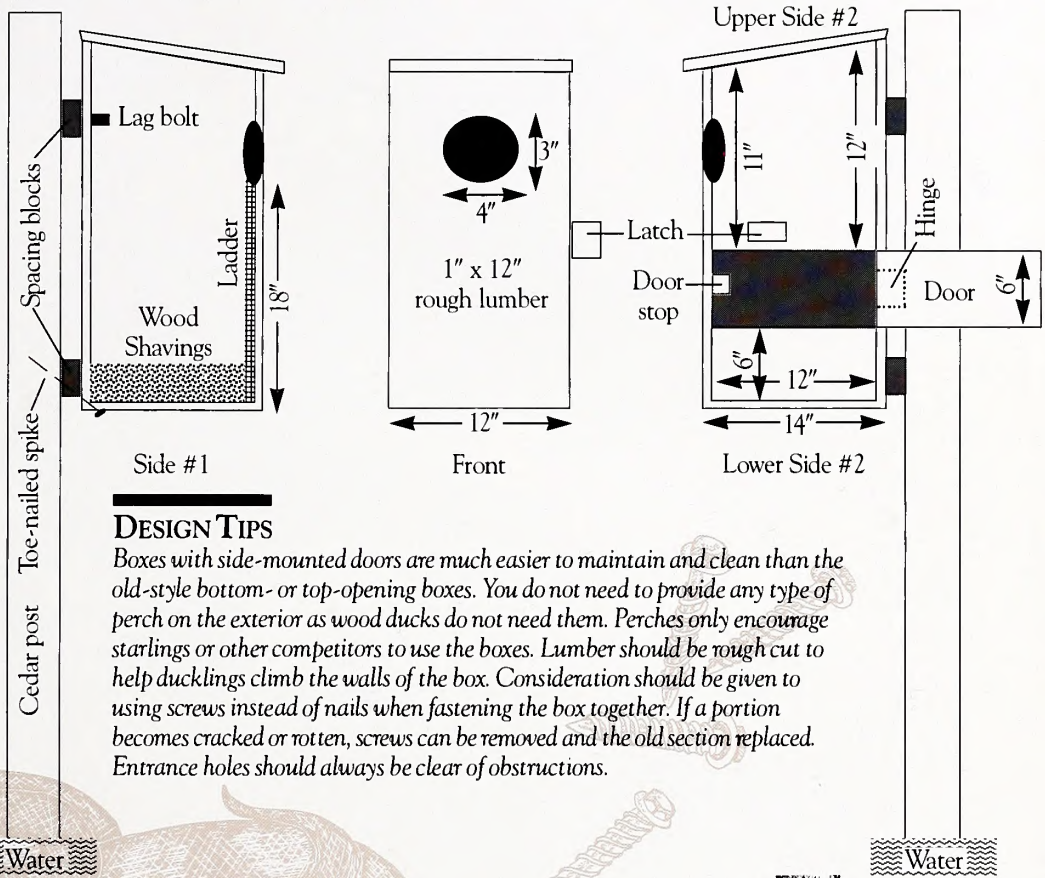


## Predator Guards

*Pictured is a layout for cutting three predator guards from a 3-foot-x-8-foot sheet of 26-gauge galvanized metal. To facilitate cutting (on solid lines only), follow the sequence of numbers. Make circular cuts in a counter-clockwise direction. To make initial cuts on line A-B, make a slot at A with a cold chisel. Use tin snips and wear leather gloves. After cutting, guards should be folded over to the slashed line, forming a cone, and fastened with 3 sheet metal screws. An X shaped cut should be made in the center of each guard. The sheet metal can then be folded back forming 4 flaps. This allows for an approximate square opening for the post to slide through. Attach the guard to the post with 1" roofing nails or screws. Many heating and air conditioning contractors can cut these guards cheaply.*




*Assembly of standard wood duck box*




## Design Tips

*Boxes with side-mounted doors are much easier to maintain and clean than the old-style bottom- or top-opening boxes. You do not need to provide any type of perch on the exterior as wood ducks do not need them. Perches only encourage starlings or other competitors to use the boxes. Lumber should be rough cut to help ducklings climb the walls of the box. Consideration should be given to using screws instead of nails when fastening the box together. If a portion becomes cracked or rotten, screws can be removed and the old section replaced. Entrance holes should always be clear of obstructions.*

## Predators and Competitors

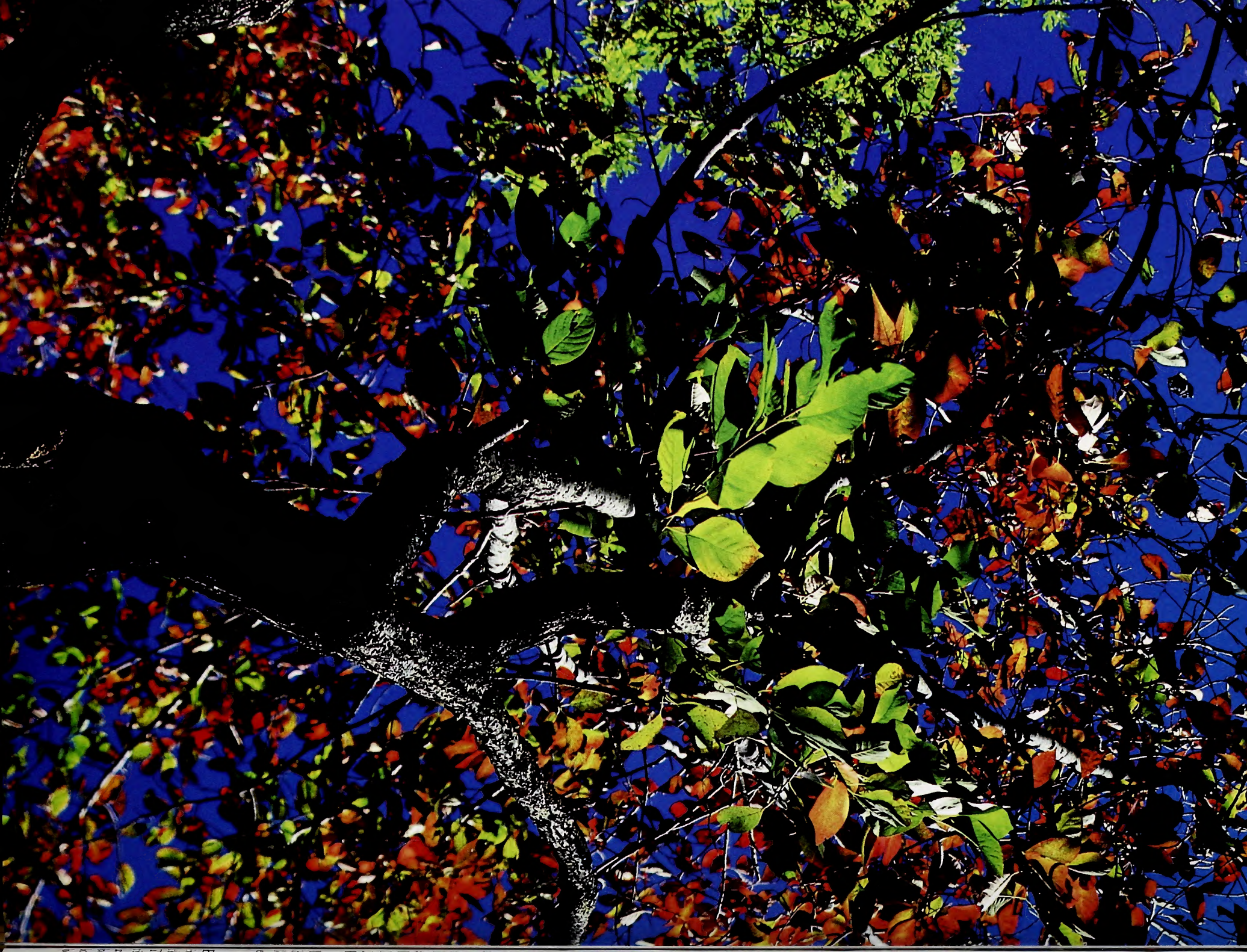
*Raccoons are the most serious predators of nesting wood ducks, and unprotected boxes can become death traps for both the adult hen and her brood. The use of cone-shaped predator guards is absolutely essential if you want your boxes to do more good than harm.* ***Never put a wood duck box up without predator guards.***

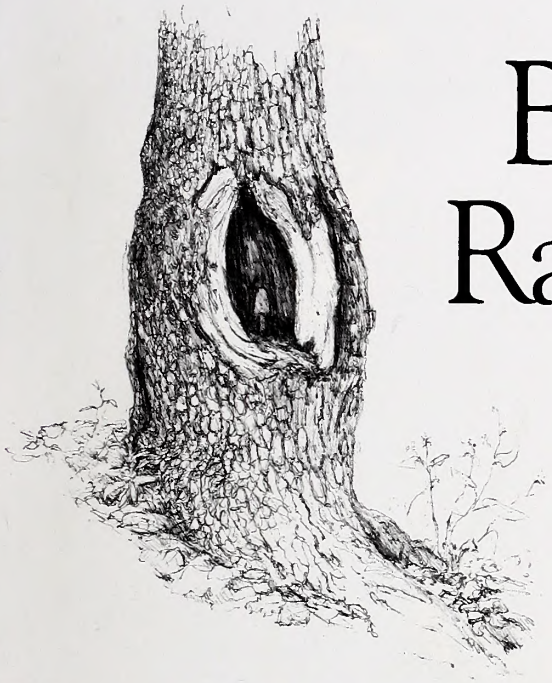
*Starlings are serious competitors for nest space in boxes, and since they are an unprotected, non-native species, their nests should be removed from boxes promptly, and adult starlings may be dispatched when encountered. Hatchling mortality from avian predators can be high but may be minimized by placing boxes near good brood habitat. Turtles commonly eat hatchlings and can be trapped and removed from smaller ponds if they are a problem. Black rat snakes are also egg eaters and able climbers, but cone-shaped guards deter almost all predation from snakes.*

## Maintenance

*Research has shown that box use is much higher and nesting more successful if boxes receive annual maintenance. Each fall or early winter you should clean out old nests, removing old nesting material, eggs and membranes, parasites and wasp or bee nests. Fresh cedar or cypress shavings should be added and any repairs made before the new nesting season begins.*

ILLUSTRATED BY KIMBERLY K. C. SCHOTT





# Bee Gums, Rabbit Gums & Mountain Toothbrushes

Time was when a rural mountain family could hardly get along without the versatile black gum tree.

written and photographed by Doug Elliott ©1994

The black gum is a mighty peculiar tree, especially since it seems to live on long after you'd think it should be dead. The young gum tree saplings often grow vigorously, straight and tall, and they regularly attain a height of 60 feet or more, although a few rare individuals have topped 100 feet. But more often than not, the trunk or one of the main branches will break off near the top. This exposed deadwood is soon colonized by various kinds of fungi and many species of wood-boring insects, and it begins to decay. As the years go by, the decay travels down the center of the tree, and eventually the entire heart will be infected. Indeed, most large black gums are hollow all the way to the ground.

What is extraordinary about the gum tree is that even after it is completely hollow, it lives on for many decades, adding new wood and increasing its girth each year while the hollow cavern in its trunk gets larger as well. It is not unusual to find a hollow gum tree 2 feet in diameter with the walls of the trunk hardly 3 inches thick.

Of course, a tree like this is of no value to lumber interests but is a boon to wildlife. The hollow depths of a single gum tree in a woodlot can provide shelter for generation after generation of wildlife species ranging from insects

***Black gum trees** are handsome dressed in fall colors and ripe with berries, but their beauty is more than skin deep. These trees have a rich legacy of practical uses for rural families, and they are particularly valuable for wildlife because older trees often become hollow, yet continue to live and provide homes for countless species.*

***The hollow trunks*** *and limbs of black gum trees were once commonly used to construct bee hives or gums, and some traditionalists still prefer them. In earlier times, many youngsters ran trap lines of rabbit gums to put fresh meat on the family table or make a little extra spending money.*

and nesting birds to rabbits, squirrels, opossums and sometimes even hibernating bears. Indeed, a hollow gum tree can still produce a good crop of berries and foliage each year, and the leaves and twigs are browsed by deer and beavers. The sour, blue black berries are an important food for songbirds, wood ducks, wild turkeys, squirrels, foxes, bears and other wildlife. As the fruits ripen in autumn, the smooth rounded leaves turn a brilliant red as if to signal the feast is ready.

The integral part that the black gum has played in the life and culture of country folk is demonstrated by the way people still use the word "gum" to refer to many items that were originally made from hollow gum trees.

There are still a few old-time beekeepers who use hollow gum logs for the brood chambers of their hives, and many country beekeepers still call their hives bee gums, even if they are store-bought supers made from dressed pine lumber.

Many a country boy has run a trap line of rabbit gums to keep his family supplied with fresh rabbit meat in the winter. In the old days when boards and nails were scarce, these box traps were often made using a hollow gum log with a sliding trapdoor. I once met a fur trapper in the woods, and although it was clear he had been setting steel traps, he cautioned me to stay away from his fox gums.

A large hollow gum stump with a board nailed on the bottom and a movable lid on top has served many a country household as a useful storage container. I still occasionally hear people talk about flour gums or 'tater gums. Even a small gum twig can be mighty handy. Traditionally, folks would chew the end until it became frayed and use it as a backwoods toothbrush. The same frayed twig has also been used as an applicator to dip snuff.

The black gum is also called sour gum, pepperidge and black tupelo. The scientific name is *Nyssa silvatica*. *Nyssa* was the name of a water nymph in classical mythology, while *silvatica* means "of the woodlands."

***Black gum wood** is dense with an interlocking grain that resists splitting, and is sometimes called "beetle wood" because it is ideal for making beetles or mauls. As kids, your grandparents might have used black gum to make the wheels for a homemade cart.*

The black gum is found all over North Carolina and throughout most of the eastern United States; however, the swamp forests in the eastern part of the state are also home to another species, *Nyssa aquatica*, which is known as the water gum or water tupelo.

When gum trees flower in spring, they sometimes yield a small crop of mild-flavored honey. This, however, is not the famous gourmet tupelo honey that comes from the nectar of the Ogeechee plum (*Nyssa ogeche*), a southern cousin to the black gum that grows in the river swamps of south Georgia and the Florida panhandle. The name tupelo is derived from the Creek Indian language and means swamp tree.

Even though gum wood is soft and light, the grain fibers interlock and grow together in such a way that it can be all but impossible to split. Because of this toughness it has been cut into veneer for the manufacture of crates and berry boxes. Those mature logs that aren't hollow can also be treated and used for railroad ties and wharf pilings. Ingenious country folk have long used black gum wood to make gun stocks, chopping bowls and ox yokes.

In some areas, the gum tree is known as "beetle wood," not so much because it harbors beetles as because it was the wood of choice to make beetles, the heavy mauls used to drive fence posts and other stakes into the ground. To make a beetle, you simply drill a hole into a sawed-off, solid section of log and drive a handle into that hole. A smaller maul to pound a froe or a chisel can be made from a small cross section of the trunk with a branch attached.

When my mountaineer buddy Theron was growing up in a "holler" back in the mountains of Yancey County, youngsters couldn't just go out to the store and buy toys when they wanted them. "We had to make what toys we had," he said.

Theron told me how he used to make what he called wagons, on which he and his buddies used to take hair-raising joyrides down steep mountain pastures. To make one of these gravity-powered, backwoods go-carts, he scavenged a few boards and nailed them to a pair of axles made of locust poles. For wheels, he used four 2-inch-thick cross sections of a gum log about a foot or more in diameter, cut with a crosscut saw. The wheels were made of black gum because of its interlocking grain. Any other type of wood would split. Theron would bore a hole in the center of each wheel for the axle to come through. The wheel was held on with a wooden pin through each end of the axle.

"We would really fly down that back pasture, buddy," he said, "but the only problem was we'd get going so fast that the axles would start smoking! So we'd have to grease 'em with meat skins (from pork). If we couldn't get any meat skins, green cow manure worked pretty well, but if you used too much it'd fly out of the axle and splatter all over you."

As I said, the black gum is a mighty peculiar tree, and its versatility has led to one or two peculiar adaptations, but if you're wondering where to find a green cow, you'll have to ask Theron. ☐

*N.C. Shooters Rack Up Awards*

## North American Hunter Invitational Tourney Held Near Advance

*Written and Edited by Vic Venters*

KEN TAYLOR

***This summer*** *North Carolina played host to the North American Hunter Invitational, a national hunter education safety tournament for junior high and high school students from around the country.*

Teams from Louisiana took top honors in the North American Hunter Education Invitational held at Yadkin Point Shooting Preserve near Advance.

The event was sanctioned by the Hunter Education Association, a national organization that promotes safety and education in youth shooting sports. The national organization was assisted by the N.C. Wildlife Resources Commission, the N.C. Wildlife Federation and the N.C. Bowhunters Association.

Jason Matthews of Fall Creek School of East Bend, North Carolina won the sporting clays junior event, muzzleloading and high overall. Tar Heel Matthew Davis won senior sporting clays with 230. Jimmy Guard of Currituck won top coach award and his team won the senior hunter skills trophy.

North Carolina competitor Eugene Bricker scored 250 for top honors in the hunter skills test. Fall Creek won the sporting clays and hunter skills titles in the juniors division.

The Caddo Bossier team of Louisiana scored 3,956.6 to take senior high overall award. Kyle Salter of the same team took high overall individual trophy and won the archery competition. Forbush High of East Bend was third in team high overall at 3,810.5. Caddo Bossier won junior team high overall. Fall Creek Elementary of East Bend placed second.

"This was a great event for North Carolina and I hope that we can bring it back to North Carolina next year," said Lt. Randy Thomas, Hunter Safety coordinator for the Wildlife Commission and a member of the Hunter Education Association's Invitational Committee. "North Carolina hosted the first Invitational several years ago at Camp Lejeune and several North Carolina teams have since won the national championships."

*—Bodie McDowell*

*Making the Commitment*

## Environmental Education Conference to be Held in December

A major environmental education conference will be held December 15-17 at the Research Triangle Park between Raleigh and Durham.

The conference, titled "Making the Commitment: the 1994 Environmental Education Conference," is being sponsored by the N.C. Dept. of Public Instruction, the Dept. of Environment, Health and Natural Resources and others, and will be held at the Sheraton Imperial, RTP.

The purposes of the conference are to develop the N.C. Environmental Education Plan that will later be taken to regional meetings and then presented to the Governor and the General Assembly on Earth Day 1995. The conference will also present to teachers, students, businesses, university and government leaders and the general public examples of outstanding environmental education opportunities now available free of charge for use in the classroom, the workplace and the community.

Registration will cost $50. Teacher registration is $30 and the price includes breakfast and lunch on both Friday and Saturday. Stipend and scholarship funds are available and inquiries should be directed to the Office of Environmental Education, EHNR, P.O. Box 27687, Raleigh, N.C. 27611, or call (919) 733-0711. Checks should be made payable to the "Environmental Education Conference" and mailed to the Office of Environmental Education. Special conference rates for rooms are available. Call the Sheraton Imperial at (919) 941-5050 for more details.

*Book Reviews*

## From Stackpole: A Pair for Wood Ducks

Ecology and Management of the Wood Duck *by Frank C. Bellrose and Daniel J. Holm. Published by Stackpole Books, 5067 Ritter Road, Mechanicsburg, Pennsylvania, 17055, 1994, hardcover 588 pages, $59.95 (add $3 S&H).*

The Unique Wood Duck *by Richard E. McCabe. Published by Stackpole Books, 5067 Ritter Road, Mechanicsburg, Pennsylvania, 17055, 1993, 170 color photos, 135 pages, $24.95 (add $3 S&H).*

While biologists admit they still have plenty to learn about wood duck ecology, virtually everything that is known about this colorful duck can now be found in the *Ecology and Management of the Wood Duck.*

With 20 chapters and almost 600 pages, *Ecology and Management* is the most exhaustive single work ever published on the wood duck. Its companion volume, *The Unique Wood Duck*, is a 135 page photo essay that combines high quality color photos with more generalized information on wood duck ecology and behavior. Both books can "stand alone" but were designed to complement each other.

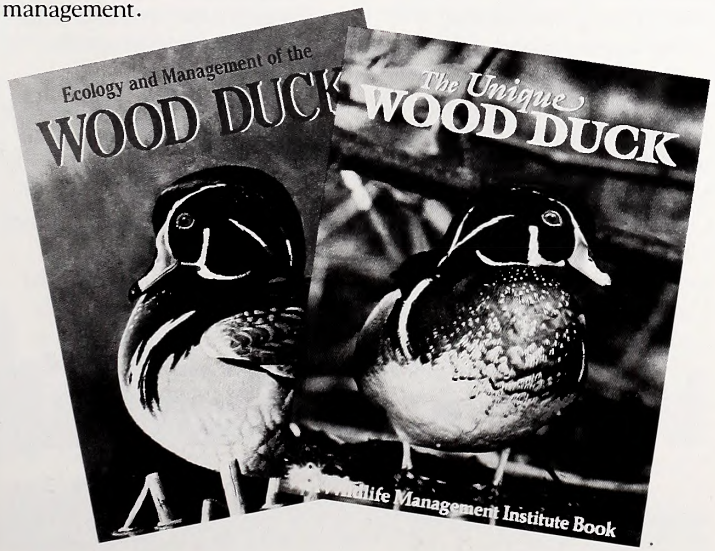
Frank Bellrose, one of the co-authors of *Ecology and Management*, can rightly be called the founder of modern wood duck management. Together with co-author Daniel Holm, the pair reviewed virtually all scientific data ever collected on the wood duck and organized it by pertinent chapter. While *Ecology and Management* cannot be called "light reading," the biological information in it is clearly explained and easily understood by general readers. The text is supplemented by profuse illustrations, charts and black and white photos.

Of particular interest to hunters and others who erect wood duck boxes are *Ecology and Management's* numerous chapters on nesting biology, nest predators and competitors, and the latest biological information on artificial wood duck boxes, including the most effective box mounting and management strategies.

The wood duck volumes are an excellent follow-up to Stackpole's similar books on white-tailed deer, mourning doves and wild turkeys.

While both books are a must for duck biologists and other waterfowl professionals, they will also be of great interest to hunters, naturalists or anyone interested in learning about this colorful native duck or how to manage for them.

—V.V.




## The 1995 North Carolina Wildlife Calendar Is Here!

***"Out in the Country"*** *by Robert C. Flowers Jr. is one of 12 paintings featured in the 1995 North Carolina Wildlife Calendar. Order now before they're sold out.*

The works of James A. Brooks, Robert B. Dance, Robert C. Flowers, Jr., Bob Herr, Lee James, Cathy Kinlaw, Brooks Pearce, Duane Raver, Mel Steele and David Williams are featured in the 1995 Wildlife Calendar. Order yours today by returning the form below with your check or money order to 1995 Calendar, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

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CALO95

*Attendance Heavy at Workshop*

# Native Warm Season Grass Management Picking Up Steam

MELISSA McGAW

***Interest is** growing in managing pastures for native warm season grasses, a cattle forage that provides excellent wildlife habitat, unlike cool season grasses such as fescue. Turnout was heavy at a recent warm season grass management seminar held this summer at the Wildlife Commission's Falls of the Neuse Game Lands.*

Native warm season grasses are attracting a lot of attention these days, as evidenced by a tremendous turnout at a recent field day conducted at the N.C. Wildlife Resources Commission's Falls of the Neuse Game Lands. The meeting provided an introduction to several species of native grasses that have potential to provide livestock forage and, if properly managed, offer much better habitat for small game than traditional grazing and forage crops on modern cattle farms.

About 175 individuals attended the event. Over one half of the attendees were livestock farmers. The remainder of the crowd was composed of an equal number of farm agency personnel and individuals most interested in the grasses from a wildlife perspective.

Native warm season grasses—such as switchgrass, Indiangrass, Big bluestem and others—compose a variety of grass species that were once far more common in the state before the introduction of fescue and other non-native grasses. Warm season grasses grow in clumps and provide excellent escape and breeding cover for a variety of ground nesting wildlife. Unlike cool season grasses, they grow actively in the summer. They are also highly nutritious for cattle in the summer and make excellent hay. Wildlife biologists hope that the benefits to cattle will attract enough growers in the state to also benefit wildlife.

During a stop at a young switchgrass field, a researcher from Virginia Polytechnical Institute updated the group on the steps necessary to establish a suitable stand of the grass. A forage expert from the N.C. Cooperative Extension Service's Crop Science Group at N.C. State University discussed the various grass species and their characteristics at a variety of plots growing the different warm season grass species.

On the afternoon preceding the workshop, wildlife representatives from the N.C. Wildlife Resources Commission, the Virginia Department of Fish and Game, North Carolina State University and Quail Unlimited met with forage experts from Virginia and North Carolina. During the discussion the group addressed concerns and discussed experiences pertaining to establishing and managing warm season grasses. Information discussed at the meeting will be used to update literature used by people interested in managing native warm season grasses. Other items discussed included coordination of establishment efforts, inconsistencies between management recommendations on stands grown for forage and wildlife, and concern over reduced funding in recent years for native warm season grass research.

Small game populations could benefit tremendously on North Carolina cattle farms if livestock producers will convert 20 to 30 percent of their acreage from cool season forages to native warm season grasses as recommended by grazing authorities. We will continue to focus attention on native warm season grasses as a means to provide extensive areas of improved small game habitat on North Carolina farms.

*—Terry Sharpe, Small Game Project Leader, N.C. Wildlife Resources Commission*

*Looking for Members*

## New Lake Management Group Forms

A new organization, the North Carolina Lake Management Society, has recently been formed to provide a forum for exchanging information on our inland waters, to help develop local lake management programs and facilitate communication among various groups interested in the management of lakes and their watersheds. The group seeks to appeal to citizens, lake associations, state agencies and businesses.

"As a grass-roots organization, we aim to attract as diverse a membership as possible," notes the Society President Bryn Tracy. "By bringing together people with different perspectives, we can begin to build coalitions and reach consensus regarding our more contentious issues."

Planning is underway to schedule and organize this year's activities. The first edition of the Society's quarterly newsletter was published in June. The Society will holds its first annual meeting in Charlotte this spring in conjunction with the Fourth Annual Southeastern Lake Management Conference. Several workshops will also be held around the state to focus attention on specific lake issues and problems of local interest.

The N.C. Lake Management Society is affiliated with the 2,200 member North American Lake Management Society. Memberships for the state chapter are available for individuals, students and groups. Call Bryn Tracy at (919) 362-3482 or Secretary Mike Struve at (704) 322-9191 for additional chapter information.

*A Whale of a Response*

## Readers Help Whalehead Club Restoration

Dear Editors,

I wanted to take this opportunity to thank you for the wonderful article on the restoration of the Whalehead Club in your June issue. The response has been tremendous. We've received letters from as far away as Iowa and Hawaii. I didn't realize *Wildlife in North Carolina* had such a wide distribution. Thank you again for your help with our effort.

—*Charles Hartig*
*Restoration Project Coordinator*
*Whalehead Club, Corolla*

*Receives Governor's Award for Heroism*

## Wildlife Officer Helps Rescue Drowning Boy

N.C. DEPT. OF TRANSPORTATION - PUBLIC AFFAIRS

***Sgt. Tony Williams** of District 2 accepts a Governor's Award for Heroism from Governor James B. Hunt. On June 20, 1993, Sgt. Williams was enjoying Father's Day at Surf City with his family. After hearing cries for help from a boy who was being carried out to sea, Williams swam after the boy and made repeated attempts to pull him from the undertow, which was severe. Sgt. Williams helped the boy stay afloat until help arrived on a surfboard.*

*Populations Rebound*

## Grouse Hunting Improved Last Year

Grouse hunting success improved last year following a poor 1992-93 season, according to the N.C. Avid Grouse Hunter Survey. Last season 80 hunters participated in the survey, taking 1,158 trips and harvesting 769 grouse, for an average of .66 birds per trip.

The Avid Grouse Hunter Survey tracks the long-term flush and harvest rates of ruffed grouse hunters. Biologists use the data as an index of population trends.

In the northern mountain region, the flush rate per trip improved about 20 percent to 3.3 flushes per trip. Hunters in the southwestern mountain counties reported flushing about 4.83 grouse per trip, which is up slightly from the 4.7 grouse flushed per trip in the 1992-93 hunting season.

According to Avid Grouse Hunter Survey data, grouse populations expanded in the late 1980s to 1991. The 1992-93 season was the poorest on record, with populations believed to have been hurt by cold and wet weather during the breeding season. With normal weather population should rebound in areas of good habitat.

## *Only a phone call away . . .*

Call **919-715-4091** anytime and use your MasterCard or VISA to purchase most hunting licenses, fishing licenses, or a subscription to *Wildlife in North Carolina* magazine.

## Wildlife Endowment Fund Report

**July 1994**

Principal Balance
$19,898,237.78

Interest Earned
$15,335,474.62

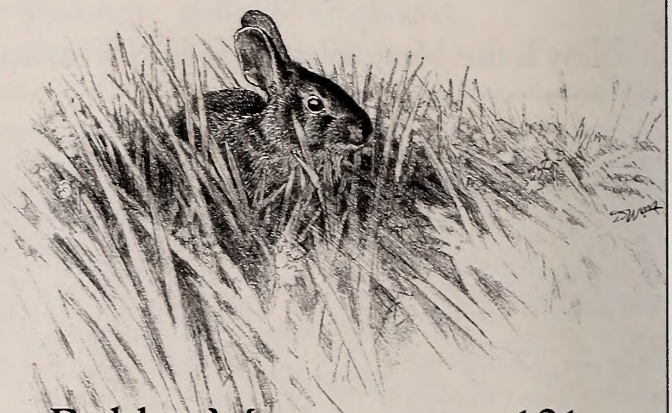
Total Receipts
$35,233,712.40

Interest Used
$7,410,551.48

Fund Balance
$27,823,160.92

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Rabbit Management 101

*by Vic Venters*

The fast-breeding rabbit is in no danger of disappearing from North Carolina but cottontails are no longer as plentiful as they once were. Changes in the rural landscape resulting from modern agricultural practices, urban development and an increase in predators have greatly reduced the state's population in the latter half of this century.

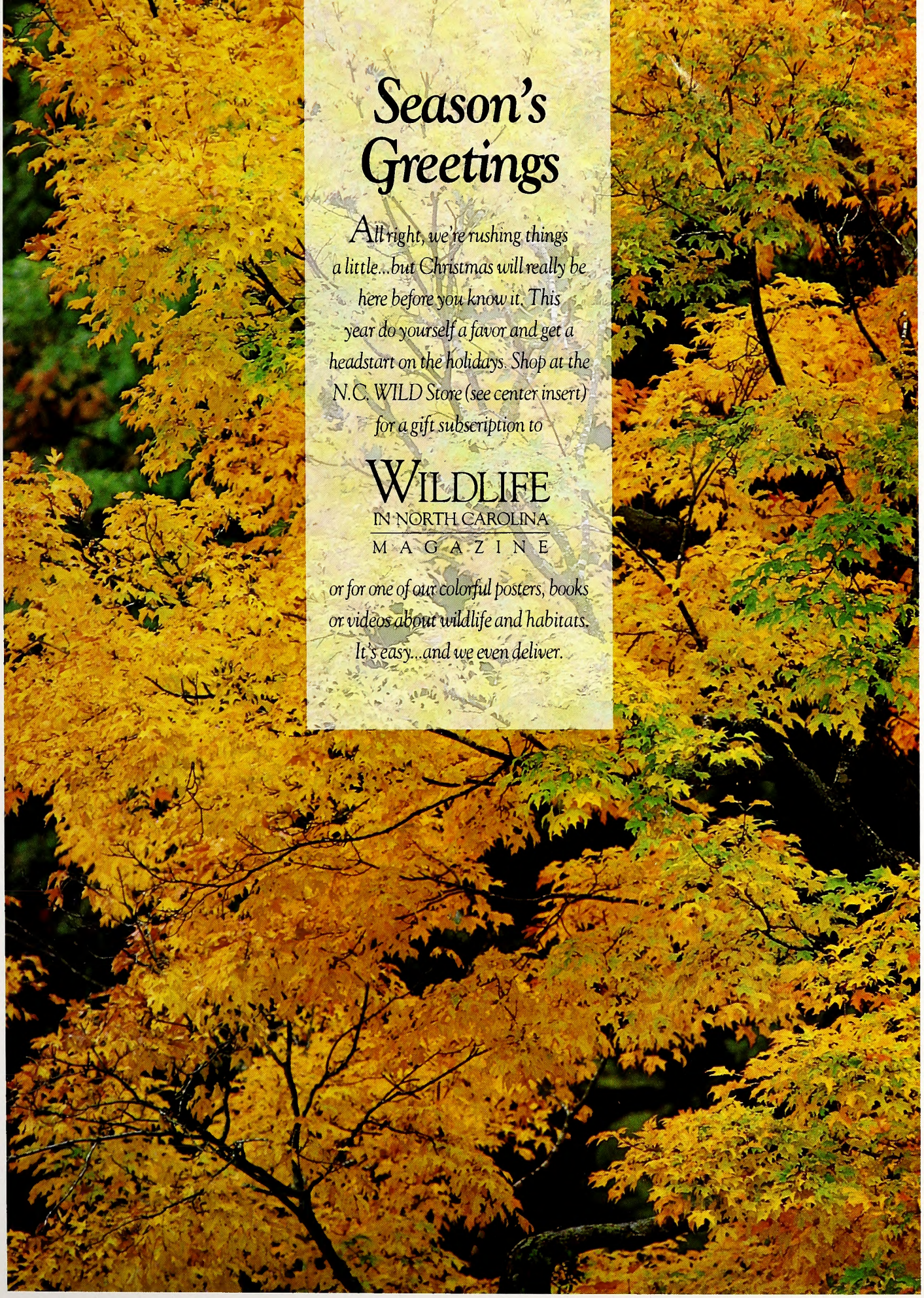
Nonetheless, rabbit populations remain good where suitable habitat is maintained or created. To help the rabbit hunting enthusiast or anyone interested in creating rabbit habitat, the N.C. Wildlife Resources Commission has recently published a new booklet, *North Carolina Rabbits: Natural History and Management.*

The booklet contains a description of the three species of wild rabbits found in the state. Also included are the life histories and preferred foods of the three species and the mortality factors that affect them.

Of particular interest to rabbit hunters and beagle enthusiasts will be the chapter titled "Increasing Rabbit Populations." Habitat improvement tips and harvest strategies are outlined, as are the pros and cons of attempting mammalian predator control. Also included is a section on the biological havoc that can result from the stocking of non-native rabbits into inappropriate ecosystems.

The 18-page publication is based on the latest appropriate biological research from around the country and, while detailed, was written for a general audience. Some of this latest research has not been widely publicized before so anyone interested in increasing rabbit populations should find the booklet helpful. The last page features outline drawings that will allow the reader to distinguish rabbit tracks from superficially similar squirrel tracks, and how to distinguish rabbit cuttings and droppings from those made by deer. The booklet was illustrated by Jim Brown, a regular free-lance artist for *Wildlife in North Carolina.*

Individual copies are available free. For a single copy, write the Division of Wildlife Management, N.C. Wildlife Resources Commission, 512 North Salisbury St., Raleigh, N.C. 27604-1188.



# Season's Greetings

*All right, we're rushing things a little...but Christmas will really be here before you know it. This year do yourself a favor and get a headstart on the holidays. Shop at the N.C. WILD Store (see center insert) for a gift subscription to*

WILDLIFE
IN NORTH CAROLINA
MAGAZINE

*or for one of our colorful posters, books or videos about wildlife and habitats. It's easy...and we even deliver.*

## Twice Blessed

The male wood duck is perhaps the most handsome of all waterfowl, and this one unknowingly treats us to a double image. Thanks to good habitat and an effective restoration program sponsored by hunters, these birds are again very abundant. Yet, half a century ago, wood duck populations were so low that some experts feared these birds faced extinction.

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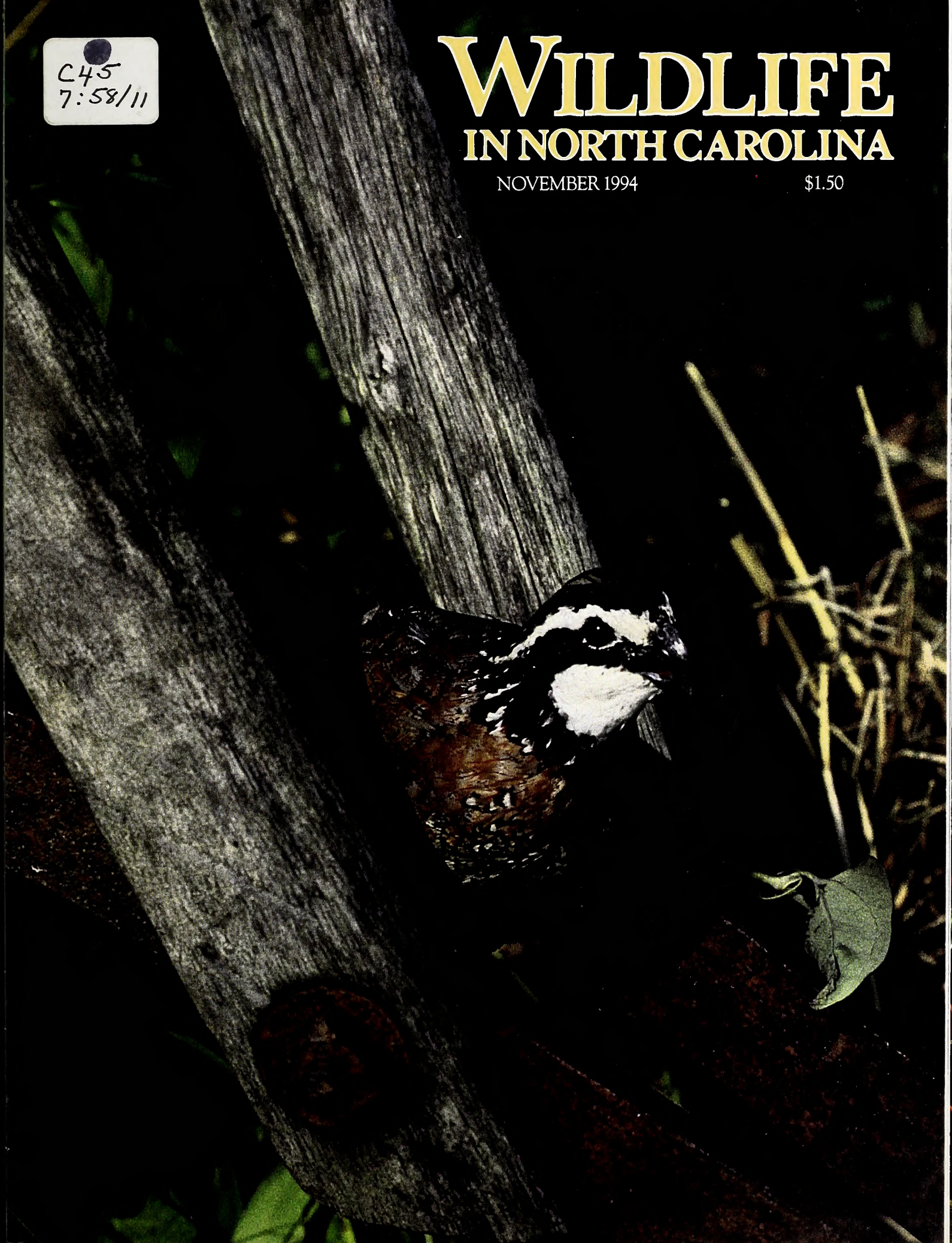

# The Laws of Discontinued Perfection

*by Jim Dean*

"You're going to buy another fly rod?" my friend exclaimed one day a few years ago as we were eating our sandwiches on the bank of a trout stream. "Just like the one you're using? Eye-dentical!?!"

I nodded in the affirmative.

"But why? There's nothing wrong with this one. Besides, you've already got half a dozen different brands of 7½-foot fly rods, not to mention heaven knows how many others in various lengths and weights. Some of them are high dollar, too."

"How old are you?" I asked. He said he was 24.

"Well, I guess you're too young to have run into the Law of Discontinued Perfection, but you will. You're right in saying that some of those other rods are okay, and a couple are very good, but it has taken me more than 40 years of fishing to find a 5-weight, 7½-foot fly rod that I really, really like—one that's as delicate and light as a 3-weight, but with the power to punch a big Wulff into a stiff wind or roll a weighted Tellico nymph under overhanging rhododendron.

ILLUSTRATION BY JACKIE PITTMAN

"Virtually no one makes fly rods specially suited for Southern Appalachian streams, but now that I have finally found such a rod, two things are certain to happen under the Law of Discontinued Perfection. First, the company is going to quit making that particular rod. Then, within a few weeks of that executive decision, I'll slam this one in a car door. Or lose it. Or it'll get sent to Antarctica on a Ford Tri-Motor by some baggage clerk who thinks RDU stands for Really Down Under. It never fails, and as a result, 40 years of personal research and experience will be shot to hell."

He gave me that look of immortal youth, the one reserved for the terminally anal-retentive.

"Fortunately, there's a way to protect yourself," I continued. "If you ever discover any product that suits you perfectly, buy at least two. Get a dozen if you can afford them."

"Okay, so what if you break both rods?" he said. "You're right back where you started, and much poorer for it."

"Can't happen," I replied. "You're protected by the Second Law of Discontinued Perfection which states that if you acquire an item in multiples, nothing will ever happen to the first one. As you get older, you'll learn to consider all those duplicates as a form of insurance, not to mention a priceless inheritance for your heirs."

"I think you've gone off the deep end," he said. "I'll bet you've got a case of Ipana toothpaste in your medicine cabinet."

"Didn't your Mama tell you it's not polite to look in other people's medicine cabinets," I said sternly. "Look, it isn't only fishing rods. For example, about 15 years ago, I fell in love with a pair of padded wader socks called Bama Sockettes. I wore them out, then learned they were no longer available. Called all over the country. No dice. Then, this past year, a friend found a supplier in Great Britain, so I ordered six pairs. I figure I'm set for wader socks until the end of the 21st century. I can name you hundreds of items—everything from worm hooks and casting reels to boots and guns—that you'd consider ideal for the task at hand, except you can't get them anymore. Why do you think high rollers are paying huge prices for reproduction Parker and Fox shotguns? The real thing ain't being made anymore."

My fishing buddy chewed his liverwurst thoughtfully, and I could see I had gotten his attention. "I guess I do have a few things I would hate to be without," he mused. "This cap I'm wearing is the only dark green Daffy Duck fishing hat I've ever seen that was made of Gortex. I would hate to lose it."

"See what I mean," I said. "You should have bought every one on the rack or written the factory and ordered a gross the moment you realized that was a good hat."

"Yeah, well I can see maybe buying two hats, but graphite fly rods are expensive," he said. "Seems to me you've got to draw the line somewhere."

"Hey, you're looking at a guy who once owned two used 1970 Mavericks with over 100,000 miles on them," I replied. "Back in the mid-1970s, I had figured out that I could buy 36 old Mavericks for the price of one entry level new BMW, and I was planning to have enough $500 disposable fishing cars to last the rest of my life. Of course, they quit making Mavericks before I'd hardly got started."

We finished our sandwiches and began leap-frogging up the stream, fishing alternate pools. I even let my buddy try my favorite 7½-foot rod. He liked it, and said he might even buy one someday.

He's too late. Six months after I bought my spare rod blank and stuck it in the closet as a hedge against the First Law of Discontinued Perfection, I got a call from my dealer.

"You know that little rod you ordered from me," he said. "I think you got the last one. I just got word it's been discontinued."

November, 1994
Volume 58, Number 11

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Department of Environment,
Health, and Natural Resources

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **Celebrate the Coast**
*North Carolina's photographers aim their cameras east as part of the Year of the Coast festivities. Here are the winners.*

12 **Hunting New Age Quail** *written by Mike Gaddis* © 1994
*illustrated by David Williams* © 1994
*Today's "partridges" didn't read Nash Buckingham. That means you'd better be ready to change your tactics when you hunt them.*

16 **Bird Man of Fort Macon** *by Eric Bolen* © 1994
*In 1869, Dr. Elliot Coues reported for duty and continued a passionate study of bird life that made him one of the nation's most renowned ornithologists.*

20 **Living at the Lighthouse** *written by Sarah Friday* © 1994
*photographed by Melissa McGaw*
*Rany Jennette was born in the shadow of the Hatteras Light, and as a park ranger at the age of 73 he still maintains his family's tradition.*

24 **Hunting at School** *written by Michael Faw*
*photographed by Ken Taylor*
*Not all weapons at school spell trouble. The Wildlife Commission's hunter education courses and tournaments highlight the most successful school program in the nation with over 525,000 graduates.*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*
**Nature's Ways** *by Lawrence S. Earley*
**Back of the Book** *by Vic Venters*
**Wildlife Through the Year** *by Vic Venters*

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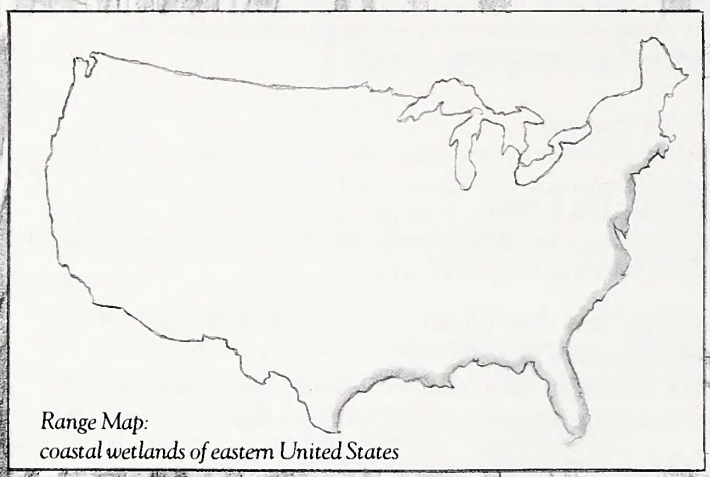
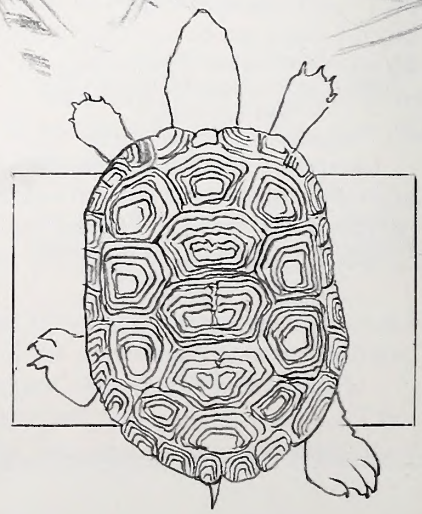
**Cover** *This pair of bobwhite quail seems right at home investigating this old plow. Photographed by Lloyd B. Hill.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**



*Range Map:*
*coastal wetlands of eastern United States*



**Diamondback** *terrapins are named for the deep grooves and ridges on their scutes. Individual turtles may not look at all alike. Shapes may differ and terrapins may well be light yellow, dark green or even black. Males are smaller than females and have longer tails.*

# Saga of the Tasty Terrapin

*written by Lawrence S. Earley/illustrated by David Williams*

**Once prized for** *its savory meat, the diamondback terrapin is the major turtle species in salt and brackish water marshes from Cape Cod, Massachusetts, to Corpus Christi, Texas. Two subspecies live in North Carolina, one from Cape Cod to Cape Hatteras, and the other from Cape Hatteras south. Terrapins eat crustaceans and mollusks, especially the periwinkles that live on marsh grasses. They are a long-lived species and may reach ages of 40 years or more.*

**Predators such as** *raccoons, foxes, gulls and crows take a shocking number of eggs and hatchlings. The high natural mortality rates, combined with heavy exploitation for the gourmet market, once contributed to the turtle's population plunge.*

At the turn of the century, it's highly probable that the most desirable and valuable morsel from North Carolina's brackish coastal marshes was not the summer flounder or the canvasback duck, but a turtle—the diamondback terrapin.

So common was the terrapin as table fare that plantation slaves objected to being fed so much of it. Yet beginning in the 1860s, quantities of the tasty turtle were being shipped from North Carolina to northern markets, mostly to make turtle soup for fancy East Coast hotels. A diamondback terrapin course often preceded hearty waterfowl dinners at Currituck shooting clubs in the 19th century.

Like so many other species at the time, the terrapin's popularity as a gourmet food caused it to be overexploited, and it almost disappeared from the Atlantic coast. The terrapin is "approaching extermination," wrote Robert Coker of the N.C. Geologic and Economic Survey in 1902. "Exhaustion of the fishery is inevitable, unless some legislative provision be made for its preservation."

Coker named a few reasons for the near extirpation of turtle populations and they are interesting even today to show how unbridled exploitation, coupled with a species's own biological behavior, can threaten wildlife.

For one thing, the terrapin's reproductive life history is not geared to heavy exploitation. The male becomes sexually mature in two or three years, but it takes five or six years for the female to be ready to reproduce. Females are larger than the males and therefore were more valuable on the market. Five- or 6-inch females, measured from the top of the plastron to the bottom, would bring nearly $25 a dozen, twice as much as males. Six-inch terrapins—known as "counts"—could fetch $40 a dozen and 7-inchers could bring $70 a dozen! Anything that put such pressure on female terrapins was a threat to the species over time.

Also contributing to the terrapin's near demise was heavy predation on relatively few eggs and young. Terrapins mate in the late spring and females lay as many as 12 pinkish white, oblong eggs, but as few as four. Foxes, raccoons, crows and gulls can often clean out a nest entirely. Surviving eggs hatch out in the fall into young that lack hardened shells and are thus dangerously vulnerable again to predation. Perhaps as an adaptation to this disadvantage, the young hibernate soon after they hatch and probably don't begin to feed until the following spring. Starting in December, the adult terrapins bury themselves in the mud of creek banks to hibernate, although they can be active during warm spells.

The greatest predators on terrapins as the century began, of course, were human beings. Though the turtle "fishery" was nearly played out by 1900, the incidental take of terrapins by fishermen hunting for clams, oysters, crabs and fish was still considerable. The laws were weak and enforcement was weaker. It was only after World War I, when the taste for terrapin soup had passed, that commercial prices declined and turtle populations began to rebound.

Ironically, the terrapin moved from the frying pan to the fire when its salt marsh habitats were extensively drained later in the century. Many believe crab pots are the greatest current threat to terrapins. The state has listed the turtle as a species of special concern today, and it is also a candidate for federal listing. A century after its populations first plunged, the terrapin is still on the ropes.

YEAR OF THE COAST

# *Celebrate* the Coast

## North Carolina's photographers aim their cameras east as part of the Year of the Coast festivities. Here are the winners.

North Carolina's coast is still an inspiration for photographers. That is readily evident by both the number and quality of color photographs entered in the photography contest co-sponsored by the Coastal Federation and *Wildlife in North Carolina* as part of The Year of the Coast celebration.

Governor James B. Hunt has officially designated 1994 as The Year of the Coast, and the photography contest is but one of many projects undertaken during the year to help raise public awareness of our coastal resources and seek ways to protect and enhance this priceless heritage. As part of the year-long celebration, well-known environmentalist, photographer and developer Hugh Morton announced the winners at The Year of the Coast banquet at the Wilmington Hilton on September 7. Gov. Hunt, who spoke at the banquet, was presented a framed print of the first place winner.

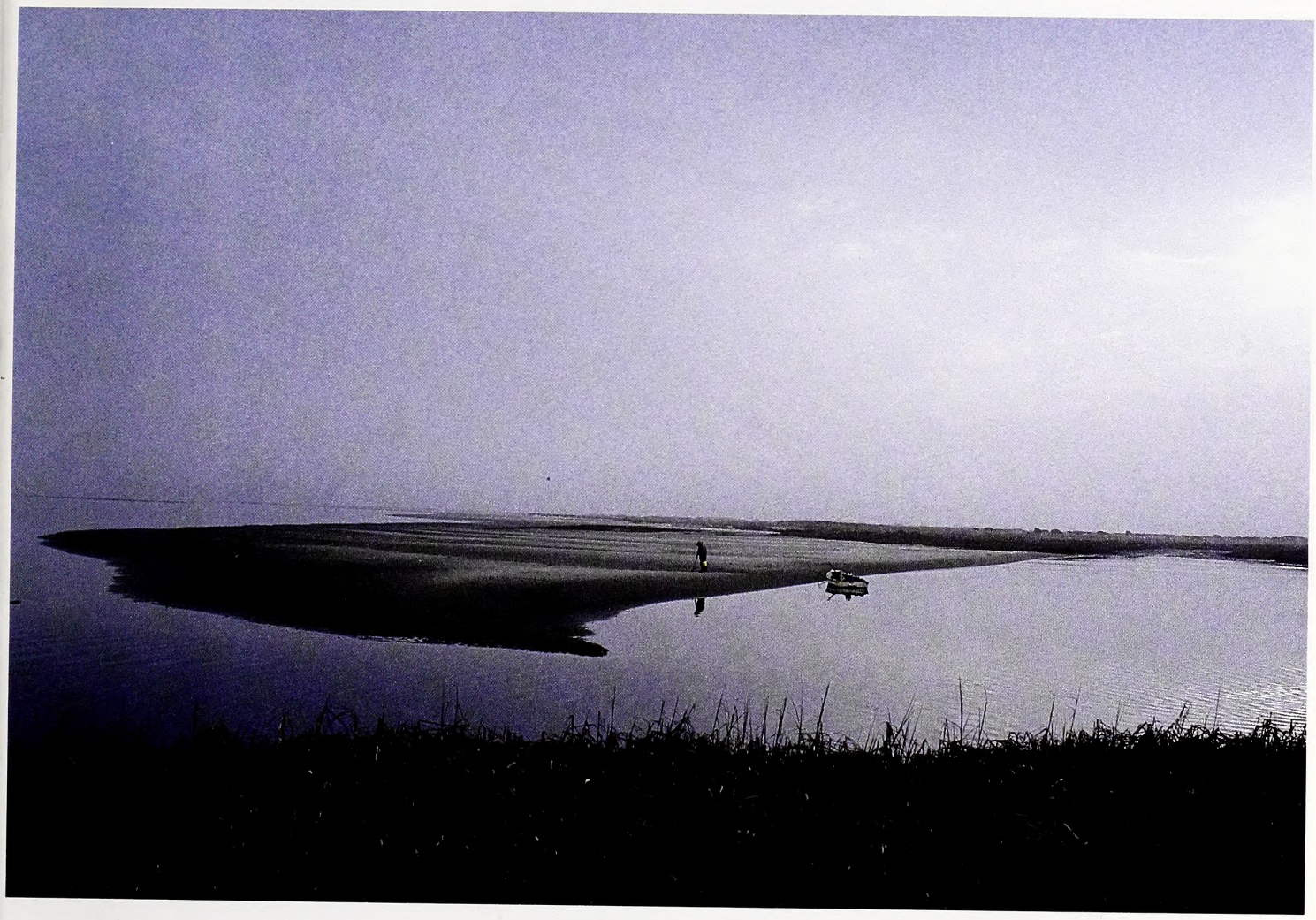
Kevin Adams of High Point won the $500 first place award for his handsome photograph of the Bodie Island Lighthouse. The photograph was taken at night with a long exposure that caused the stars to leave trails across the sky. Russel Lee Klika of Jacksonville won the $250 second place award for his evocative photograph of an American egret in the act of capturing a fish. Charles H. Brown of Clayton won the $100 third place award for his moody scenic of fishermen wading in a tidal pond behind Bear Island. Seven North Carolina photographers received honorable mention awards for superb color photographs of a variety of other scenes along our coast.

There were 92 entries in the photography contest, and the judges were hard-pressed to narrow these down to the three winners and seven honorable mentions. It may be of interest to know that four subjects dominated the entries. As you might expect, sunrises and sunsets were very popular subjects, as were lighthouses, ocean fishing piers and banks ponies. The overall quality of entries was excellent, and certainly ample proof that our state is home to many fine photographers.

We offer our thanks and congratulations to all who entered the photography contest, and our appreciation to the many others who have played a role in The Year of the Coast activities. Take a few minutes to look at the winning entries and, as you do, we hope you'll make a personal commitment to do your part to make certain that these and our other unique coastal resources will always be enjoyed by future generations.

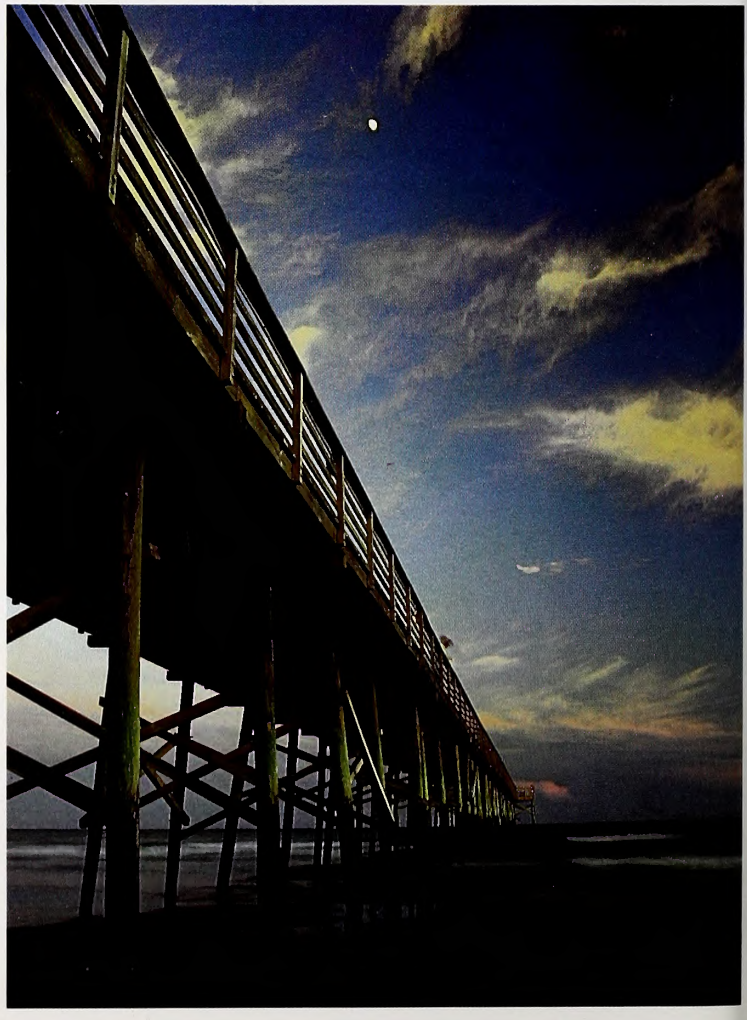
***First Place, Bodie Island Lighthouse***
*Kevin Adams, High Point*

***Second Place, Morning Catch***
*Russel Lee Klika, Jacksonville*

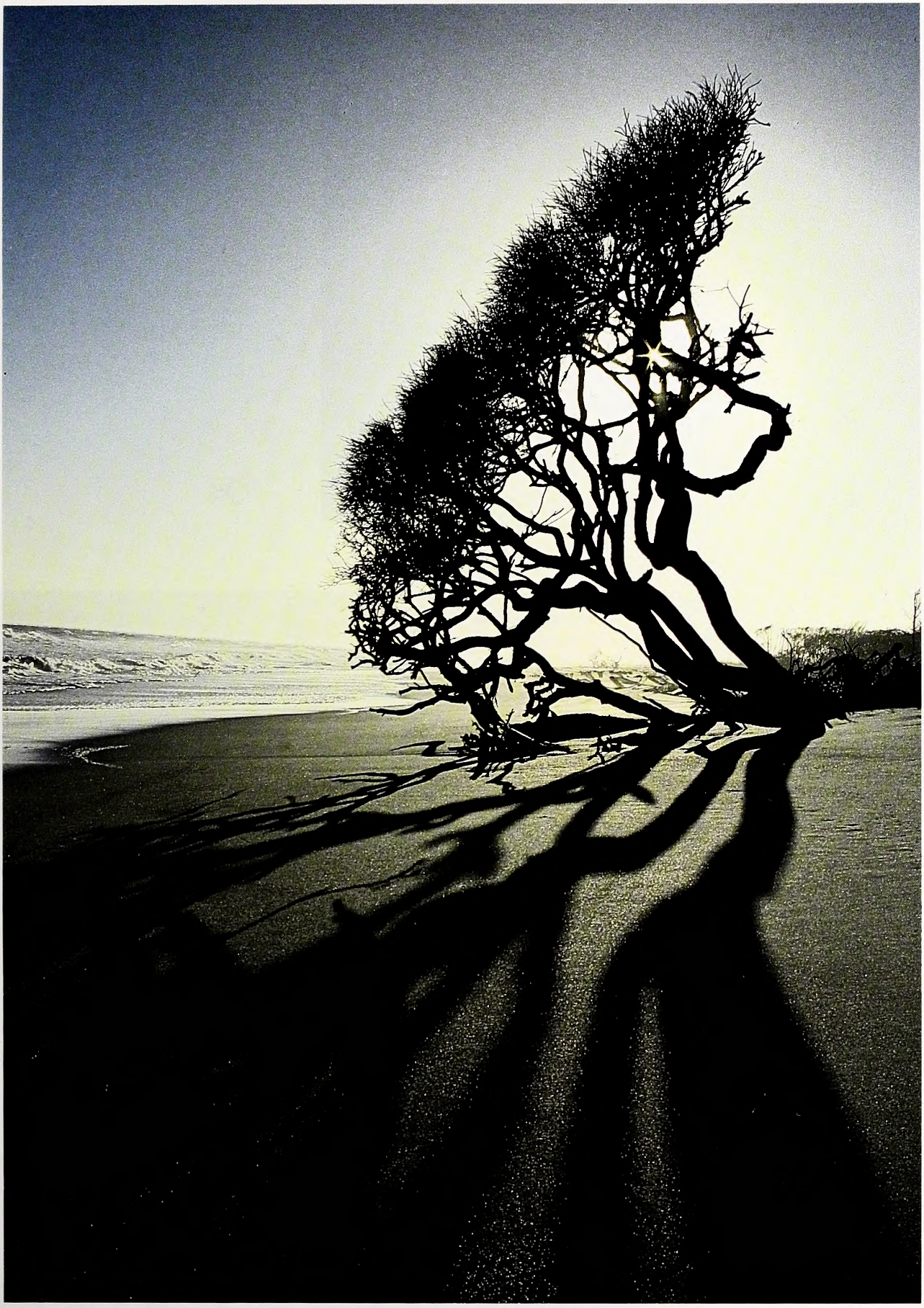


***Third Place, View from Bear Island***
*Charles H. Brown, Clayton*

*Barbara Mather, Morehead City*
**Honorable Mention**



*Keith Phillips, Greenville*
**Honorable Mention**

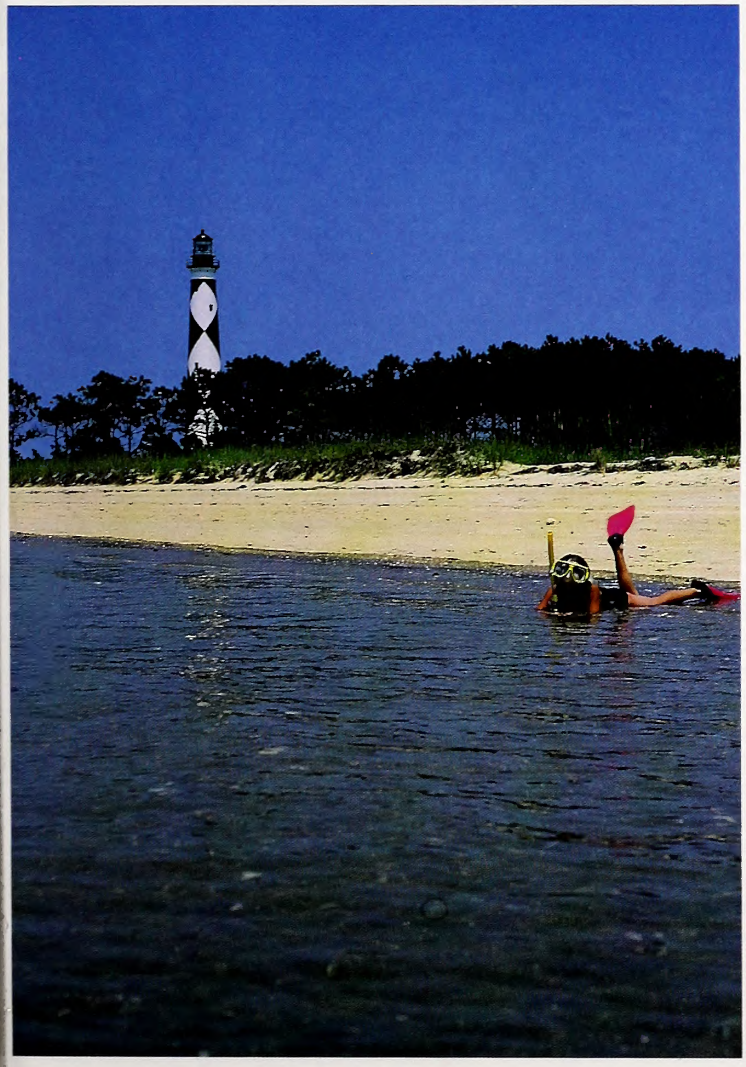


*John Althouse, Jacksonville*
**Honorable Mention**

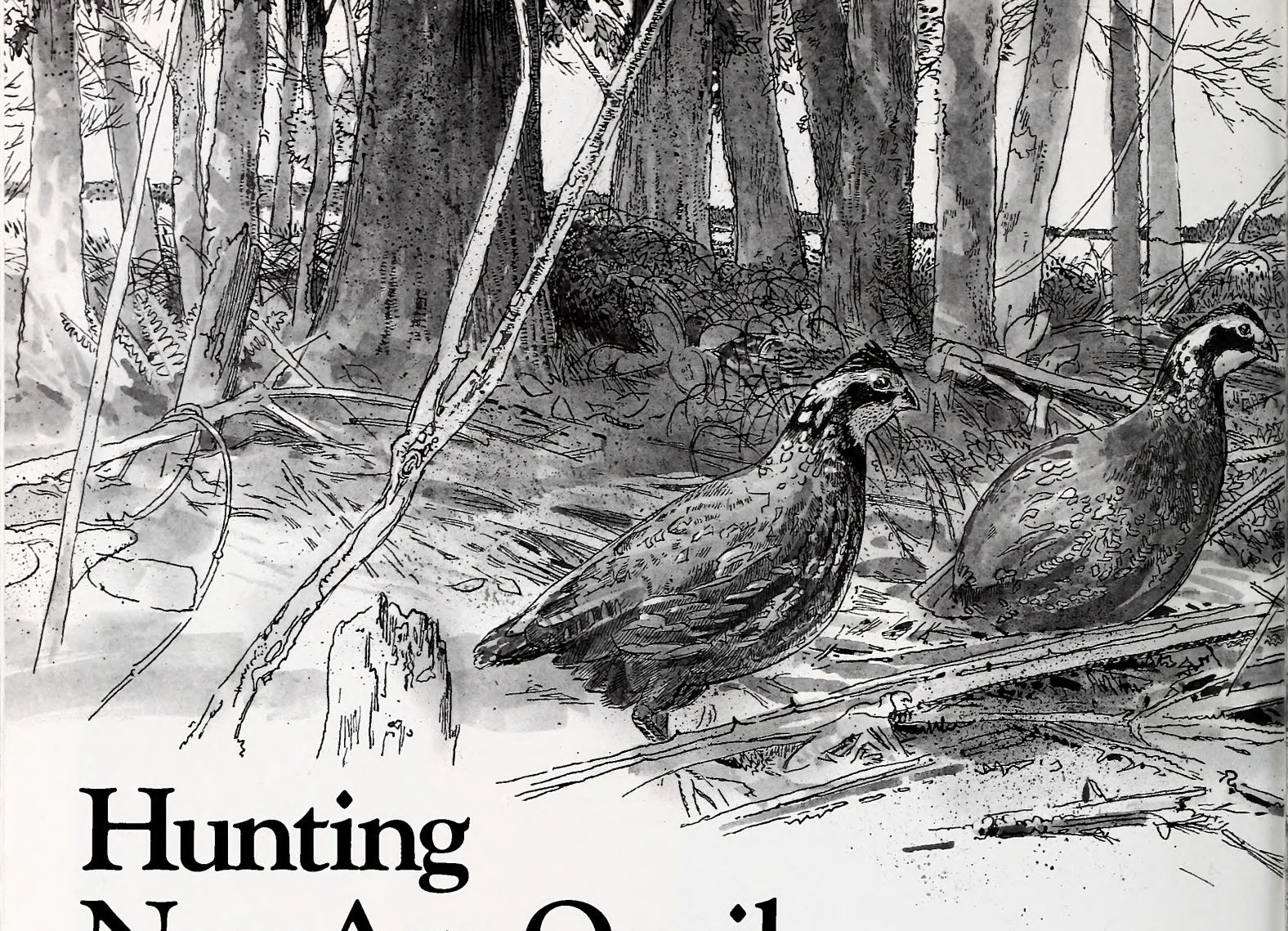
*Linda Bergman, Jacksonville*
***Honorable Mention***

*Chip Millard, Wilmington*
***Honorable Mention***

*Jean Setzer, Newton*
***Honorable Mention***



*Barbara Theisen, New Bern*
***Honorable Mention***



# Hunting New Age Quail

Today's "partridges" didn't read Nash Buckingham. That means you'd better be ready to change your tactics when you hunt them.

written by Mike Gaddis © 1994
illustrated by David Williams © 1994

For the better part of 30 years, I have had an unrequited craving for a 28 gauge. It has haunted my reverie in many disquieted evenings, waxing ever more solicitous during fall and winter.

Arising in recurring fantasies among countless quail outings, it comes to shoulder as a maiden-waisted, fairy-weighted little bit of sidelock artistry, stocked in exquisitely burled, Turkish Circassian walnut and adorned with a tasteful rendering of birds and dogs set in floral scroll. The petite, twin bores are married side by side, betrothed improved and modified, and consummated in a gracefully sweeping fusion for the 28 inches of their upland persuasion. It tracks my shooting instincts and reflexes as if it were born of me, and time and again I execute crisp and impressive doubles on bountiful bevy rises.

The 28 I might have, now that I can finally muster the means. Bountiful bevy rises in North Carolina come rarely these days. What's a belle without a ball? Perhaps it's best left the girl of my dreams.

I am told the quail population is down by half relative to the late 1960s. My dog, Meg, contests that figure, after running herself into the ground several times last year without a find, surmising that it's more like three-quarters. I tend to side with her. What's more, over the same period, my eyesight seems to have diminished by at least that much, and my reflexes are close behind. I don't spring over honeysuckle heads like I used to. Fortunately, and unfortunately, there aren't too many around anymore, their having departed the landscape into relative oblivion along with briery heads, bays, laid-out pea fields and sawdust piles. Simultaneously, the birds, it seems, have gotten 54 percent smaller, fly 67 percent faster, and mount perplexing egress actions 73 percent more frequently than they did 30 years ago. Consequently, I miss them 29 percent more of the time than then. Meanwhile, I'm pining over a small-bore quail gun with a load and pattern 43 percent less than

I'm used to? I was never great with arithmetic, but I tried to graph all this out for the intersect of relative, contemporary efficiency and found I bisected 37 percent below its juncture. Romance has lost its blossom, at least temporarily. I'll wait a bit on the 28.

This all started, of course, shortly after the close of the Civil War. I know this to be the case, having encountered a captious Davidson County landowner a number of years back while trying to gain access to a neighboring farm. At that instant, he was embattled with a recalcitrant Farmall, but when I inquired of bird hunting and ownership on the property in question, he altered the point of reference to the late conflict between the Blue and Gray. For those unfamiliar with North Carolina quail lore, it may be instructive to relate that, in the half century between 1880 and 1930, the Davidson-Davie-Iredell-Rowan County quadrangle was the quail mecca for well-heeled, northern sportsmen.

"You 'kin try your luck. Hit won't do you much good," he said, cocking his head and squinting defiantly. "The Yankees came down and shot the big birds out. Then they up'ed and brung in the Mexican stuff . . . light in trees, make a big circle, hit's been down'ill ev'r since!"

I've heard a lot of tales about the size of those ole-timey quail. By oldtimer's accounts, they were at least half again as big as those of today but were apparently pretty well gunned out by the 1940s. Some think they are a myth and I've been shown only a couple of birds in 30 years that had the heft. But I have heard it from enough men who were there, who have lived bird hunting all their days, to believe it. Harold Britt, a early-day and well-known bird hunter in the Giddensville area, told me recently that he got into one last bevy about 10 years ago near Turkey.

"But they're gone now," he lamented. "Those old, big birds were altogether different. You could flush 'em and they'd not leave the field . . . just scatter out up and down the hedgerows and wait for you. Stayed put for the dogs. Acted like a different bird from those now. Before we ever got out of the singles, we'd be in two or three new coveys. Hey, them little bumblebees now leave out o' here!"

Whether descendants of the Mexican stuff or ole-timey birds that gradually learned it was better to light a shuck for the woods at the first sign of trouble, the compact model we hunt today wastes no time when disturbed in putting tailfeathers over teakettle toward the thickest place in three counties. They've refined it to an art form and assembled an accompanying arsenal of covert, diversionary maneuvers that would be the envy of any military tactician. Their reflexes are set on a hair trigger, and most of the time they don't need much of a send-off.

Last season, Meg pointed four times on four different occasions in the same little swale, just off a beanfield edge. There was light cover, as almost everywhere nowadays, but enough to make it a probability. The first

time she locked up, she was sky high and tight, drinking in the inebriating scent with pulsating nostrils. I saw no need for question and directed my companion to sally forth from the left while I took the right. We walked by our dog in that hypertense moment of supreme suspense with our guns at half mast . . . and . . . nothing happened. We kicked around at everything promising, but no feathers. I looked back to Meg for a confirmation, and she still stood like a tabernacle statue. So, we kicked some more. Finally, I went back to my dog for a parley, and she wouldn't relent, so I asked her to relocate. She was fired up and tried valiantly, but no birds!

With round two, she pointed in almost the same spot as before. And just as intensely. Meg's a seasoned dog and a good one. Honest and trustworthy. "All right, girl, you've got my attention." This time I was alone, and on the premise that the birds might be running I circled way around and came in from well to the front. It often works. Not that day. I turned every leaf right up to Meg's front feet and flushed nothing. The relocation bid came up empty, just as before. I left it to Meg's discretion and she took in a good bit of the perimeter.

Round three brought another virtual encore. Meg stiffened into a high stand but then flagged a bit. I clucked an OK to urge her up, but she said no, the ground at paw was the better part of discretion on this wild bunch. I normally won't settle for that. I want a dog tight and certain on body scent if at all possible; you keep him together longer that way. But, under the caveat of our prior experiences, I accepted her opinion. Sir, my male dog, was along, wanting to exercise a bolder decision, but he accepted the verdict and settled into a back. I flailed around far and wide at everything that had any suggestion of concealment for quail, covey or single. At last, downtrodden, I trudged back to Meg. She was standing sheepishly, as disappointed as I, and had let down considerably, no shot having been fired for the third time. This day, I directed the relocation effort, and the three of us vacuum-cleaned the better part of 5 acres. Ditto.

We took that loop again in a cold, steady drizzle on a muted afternoon two weeks later. I simply couldn't believe it when we rounded the corner and found Meg on point there for the fourth straight time. She was loose and flagging, a good ways back of her earlier stands. It was getting to her too, and she was becoming overcautious. I urged her on, but she wouldn't go and I couldn't blame her. I was coming undone myself. Halfheartedly, I set out the plan of advance to my shooting partner. We would both go way out and around, converging to the center. It was well executed but once again unproductive. Then, as we carelessly walked back to Meg, the covey got up right under her nose. I shot for Meg's sake but was a long ways from getting my laggardly attended shotgun on plane with their ascent. The single bird I tried rocketed away in a terse, vertical spiral to the right oblique through the third-story limbs of nearby pine, and all I got was a shower of bark and few needles. Same with my friend. We looked at each other incredulously, duped again by Bob's change-up tricks.

I learned a good while back to hunt new-age quail as quietly as possible, for it takes so little to provoke their departure. That particular covey was not atypical and hearing us, despite our efforts at stealth, would vacate the premises forehand. We had an edge that last day with the sodden footing, but then they caught us with the change-up ploy. I'm sure you've shared similar frustrations.

Quail are disturbed much more today than they were 15 years ago. Bird hunters are the smallest part of it. The first half of the quail hunting season is overlaid by the regular gun season for deer. Of course, with burgeoning deer herds, the excitement of big game and commercialization, deer hunting is more popular than ever. In many areas of the state, during this period, birds are disturbed constantly by an incessant procession of deer hounds and deer hunting parties. Add to that kids on recreational four-wheelers and dirt bikes, with the ever-present, tagalong contingency of free-lancing housedogs, throw in the increased rural nonhunting activity of all types, and by January the birds are so sensitized they are seldom found. They have long since left the open field edges for deep thickets, canebrakes and bays. More and more, they have learned to fly to and from these sites for short feeding sojourns and do their resting and preening in the hard going rather than risk predation or agitation at field side. Any time a covey is broken, it increases the likelihood of mortality for its members, and

the singles, as well as the bevy, become increasingly testy. The less disturbed any wild species, the greater the opportunity for productive hunting. With quail, I believe it goes even further, for loafing and grooming are major parts of their life cycle. When constantly interrupted, they're going to do what's necessary to be left alone.

A prime example is the Sandhills Field Trial Facility at Hoffman. Pointing dog trials have grown in popularity also, and as grounds for running dogs on horseback have become increasingly difficult to find, the member clubs of the N.C. Field Trial Association have had to rely more and more on the Hoffman facility. In addition, a major shooting dog futurity, regional amateur shooting dog and all-age championships, and open shooting dog and all-age classics and championships are conducted there each year and draw a large number of competitors from other states. The result is a heavy schedule of trials, which has kept the courses constantly in use. This has been true for some time. It didn't take long for the resident quail population to become sensitized to the pressure. The wild bird population has suffered at Hoffman since the 1970s, as elsewhere, despite intensive management by the N.C. Wildlife Resources Commission, and this has crippled one of the best field trial grounds in the country. I can remember running dogs at Hoffman in the Region 3 Amateur Shooting Dog Championship about 1982, when you couldn't buy a find. And we were running the cream of the crop, dog-wise. It was a game of roulette, not suitably equitable for competitive field trialing. Shortly afterward, the N.C. Association, in cooperative with the Commission, began supplementing with released, pen-reared birds. This has been continued and intensified, of necessity.

Hunters west of the vast acreage of the blackland Coastal Plain who are fortunate enough to have access to reasonably good bird territory by today's standards are well advised to hunt it no more than once each week. Even then, you can't control the various disturbances that are bound to occur.

One super-abbreviated whack, on the rise, is about all you get on sensitized coveys. Occasionally you can locate a single or two, but usually the entire bevy picks up and temporarily fragments, executes one or more aerial deceptions while in view, then reconvenes before settling into a deep thicket hideaway. From a deer stand, three years ago, I watched a covey do exactly that on two separate occasions. My host was a bird hunter. I was at the head of a long bottom, just outside an expanse of dense second growth. At the far, lower end of the bottom, a full quarter of a mile distant, were a couple of beanfields and lespedeza strips. A bevy ranged back and forth through the big bottom, roosting in the thick head. I had observed them making their way to roost several times. One day, about 4 o'clock, I caught the flying covey in the corner of my eye as they wheeled and banked off the ridge behind me, swooped the upper end of the bottom, and settled into their thicket. Three weeks later, it happened again, except this time they careened and spiraled off the hillside in front.

Some time later, I was comparing notes with the landowner and asked about his bird hunting success.

"Well, it's been frustrating at best," he replied. "Twice in the last three weeks the dogs have done their best to get that bottom covey pointed, but both times they got up wild. We thought we knew where they went, but they outfoxed us. We ended up huntin' most of the big bottom and the next one over, but we never found 'em. Beats the heck out of me."

*"I learned a good while back to hunt new-age quail as quietly as possible, for it takes so little to provoke their departure."*

Sensing a coincidence, I asked him to pin down the exact dates and times.

"I know where your birds went," I said, with a grin. When I told him, he couldn't believe they had flown that far. But they did, taking two sharp hooks to perform the maneuver!

Today, you can watch the birds away and make a makeshift judgment, but any directional probability is more arduous to discern than ever. You are as well advised to forget what you can see, reason out the possibilities, then just pick up and go there. This has been increasingly true for the last 15 years, but now you'd better figure in a few more allowances than before for distance and multiple deflection antics. I have made it work a few times lately, by searching farther than I ever would have thought of in the past.

Jim Dean, his son Scott and I hunted on Jim's farm near Oxford one afternoon last December in the remnants of a morning snow. It had warmed and was clearing, a beautiful occasion for birds to move. We put down about 2:30 into a laid-out field bordering a young cutover. Under the newly emancipated sun, the landscape stretched away like a freshly rendered watercolor, glistening accents of white painted against the subtle winter notions of the melt. Christmas come early.

We hadn't been down 15 minutes before we were missing a dog. We split up and began the inquiry, and while in progress Jim stumbled onto a sizable windfall covey. Meanwhile, the dog showed from the front, hunting, and we reassembled.

"I can take you to those birds," Jim said excitedly. "I know exactly where they are. They didn't go far, just flew up and pitched back along the ditch bank."

Charged with enthusiasm, we set sail. Forty-five minutes later, we had fine-toothed that ditch run and the adjoining cover for the fourth time. Meg took it as nicely as you could ask. It was a likely place for them to have gone, no doubting that, although Scott and I gave Jim a hard time about eyesight and senility. But they simply weren't there. My hackles were up by then, and I was determined to find those birds. We hunted and hunted, over an area larger than we would have ever covered even ten years ago, ruling out every abstract possibility we could think of at the time. We never found a solitary bird. Thinking back on it later, I had no doubt those birds settled initially by that ditch bank, but after Jim left, they got up again and flew a long ways to a safer spot. You can bet it was thick.

When birds get scarce, and the few coveys you find pull such tactics, good dogs get wider too. A top bird dog lives for one thing—to find birds. If they don't find them here, they're going there, and there is wherever their instincts, drive and nose tell them to go. They'll keep driving until they find birds, wherever it takes them. And a good dog will find birds if they're there. These days, it takes them farther and farther, and invariably into heavy cover. Heavy cover now means swamps and deep thickets. You might as well count on it.

If you can keep up with your dog, he'll bail you out some days. The worst thing you can do is to hack him down. A blaze orange collar, a bell or a beeper has become standard equipment with most hunters. If you aren't using these helpful accessories and are hunting day in and day out with naturally close-ranging dogs, you're handicapping yourself. Close dogs went with close quail. For those who want to be maximally advantaged in this regard, I will repeat something I have recommended to dog handlers many times, from years of personal experience. Radio telemetry equipment is a very good investment.

Amid the quail depression, I've become a bit more appreciative of woodcock than I used to be. They're down too, but at least when my dogs ply the thick stuff for quail they come up with a woods' snipe now and then.

Maybe I could manage a timberdoodle with a 28. Love dies hard!

# Bird Man of Fort Macon

In 1869, Dr. Elliot Coues reported for duty and continued a passionate study of bird life that made him one of the nation's most renowned ornithologists.

by Eric Bolen ©1994

KEN TAYLOR

***While Elliot** Coues was not particularly impressed with living conditions at Fort Macon, the abundance of wildlife—particularly birds—provided a fertile study area for the soon-to-be-famous naturalist.*

The young Army surgeon surely was relieved. Compared to the searing harshness of the Arizona desert, the freshening sea breezes sweeping across Bogue Banks were a welcome change. It was February 1869 and Dr. Elliot Coues, a 26-year-old brevet captain in the U.S. Army Medical Corps, had just reported for duty at Fort Macon—the five-sided bastion guarding Beaufort Inlet and later the site of North Carolina's second state park. The historic fort had been captured without bloodshed by the state militia in 1861 but returned to the Union invader's control after a savage one-day artillery bombardment on April 25, 1862.

Located on the eastern tip of Bogue Banks, Fort Macon stood as a masterpiece of brick construction, and a far cry from the rude palisade of logs forming the defenses at Fort Whipple in the far-off Arizona Territory. In 1864-65, as the bloodbath in the East ground to a conclusion, Coues had labored as an assistant surgeon in the desolate heat and aridity of the southwestern frontier. But now gentle waves lapped at the very edges of his new duty station in North Carolina. Between February 1869 and November 1870, young Capt. Coues was to gain a new opportunity for continuing his passionate study of birds.

Elliot Coues had established his presence in ornithological circles by the time he arrived at Fort Macon, but his monumental *Key to North American Birds* soon made him a giant in the field. The first edition of the *Key* (and there were five more editions to come) appeared in 1872, which suggests that a good deal of the work was completed at Fort Macon. Because of this and his other published work, Coues "will always retain his rank as one of the greatest of ornithologists," according to Dean Amadaon of the American Museum of Natural History.

Coues' labors at Fort Macon extended well beyond the routine duties of attending patients in the post's shabby infirmary, a wooden structure lying well outside the walls of the ramparts. Wherever he was stationed, Coues (pronounced "cows") stole off from the confines of the garrison to observe and collect local wildlife. At various times Coues doctored for the Army in North Dakota and South Carolina, but always he collected a wealth of specimens. Birds were his specialty, but mammals, reptiles and insects also were within the realm of his studies.

Like other ornithologists of his day, Coues had no specialized training in natural history. Today he might be called an amateur, despite his medical training in anatomy and related topics. As was true of John James Audubon, John Burroughs and even Charles Darwin, what Coues knew about nature had been acquired from patient observation and long hours in the field. Thanks to such "amateurs," a number of modern sciences were firmly established in the last century, and Elliot Coues is rightly listed among those who gave ornithology the professional standing it enjoys today.

Immediately after his arrival at Fort Macon, Coues wrote his long-standing patron, Spencer Fullerton Baird, a titan of natural history and second in command at the Smithsonian Institution. The letter was a request for collecting materials: a bag of "mustard seed" shot, 4 pounds of powder, and 1,000 caps and wads. Coues would not be without his own munitions, even at a U.S. Army garrison. In return for these supplies, Baird received most of the specimens felled by Coues, an arrangement the two men honored wherever the Army stationed the young physician-naturalist.

That Coues relied heavily on a shotgun for his studies of birds was not inconsistent with the scientific mores of his day. Cabinets jammed with specimens were the *sine qua non* for 19th-century ornithology, and Coues held few reservations about the matter. "How many birds of the same kind do you want?—*All you can get*—with some limitations; say fifty or a hundred of any but the most abundant and widely diffused species." And more: "If forced to reduce bulk [of birds already collected] throw away according to size . . . eliminate the few large birds which take up the space of fifty or a hundred different little ones. If you have a fine large bald eagle or pelican, for instance, throw it away first, and follow it with your ducks, geese, etc." Thankfully, most modern ornithologists are constrained by both their own ethics and the law; nevertheless, thousands of bird skins collected by Coues and his contemporaries are scientific prizes still carefully preserved in our nation's most prestigious museums.

More than once a commanding officer won-

dered if Coues' attention to the local fauna might not be at the expense of his patients. Coues indeed acknowledged trouble with one of Fort Macon's commanders, Maj. George M. Brayton, declaring that "my Natural History must be carried out clandestinely." As a further encroachment on his medical responsibilities, the cabinets in Fort Macon's hospital no doubt enclosed far more than an assortment of medical hardware and curative potions—where else might the good doctor store his burgeoning collection of bird skins?

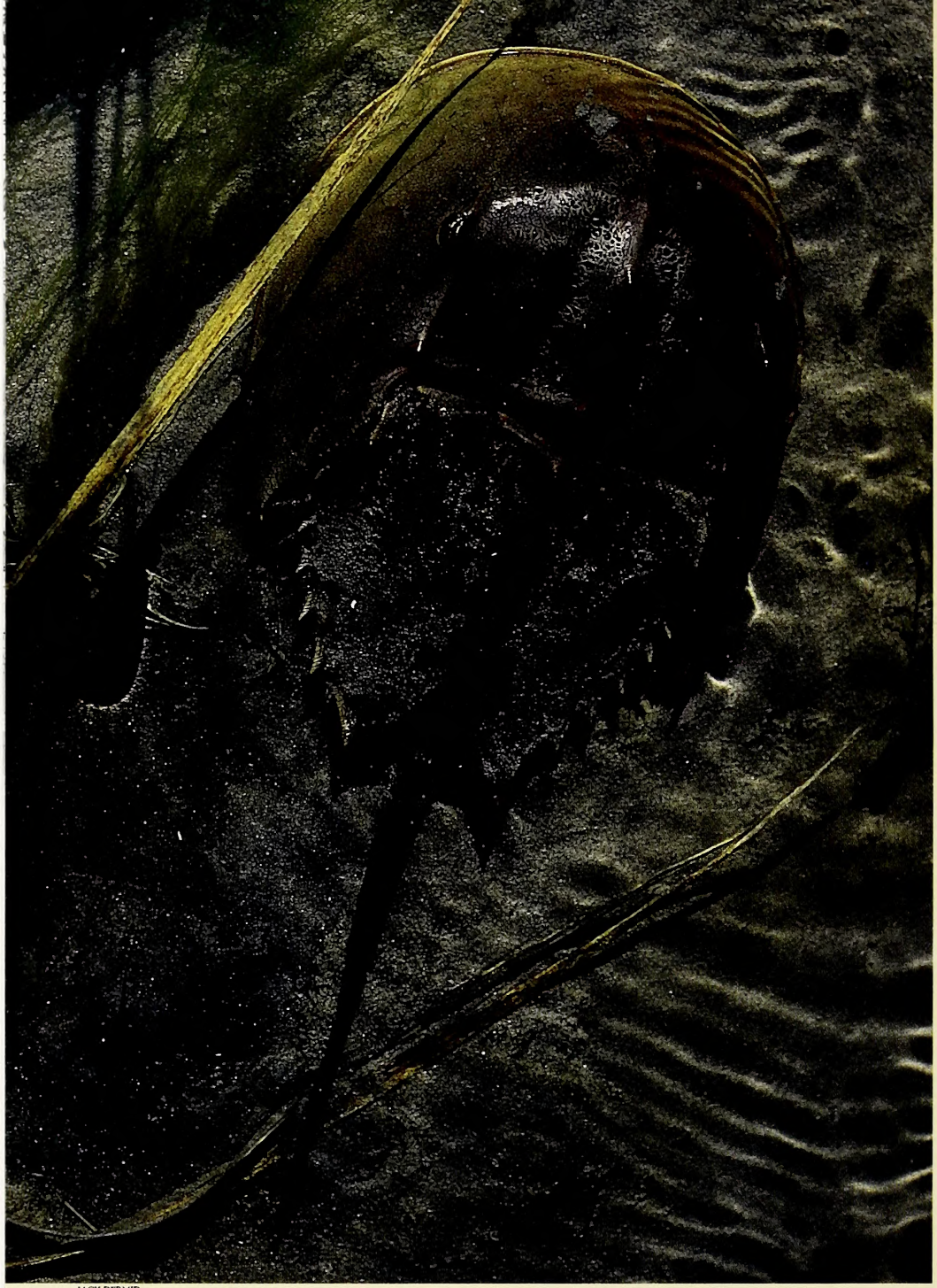
Coues enlisted the aid of his hospital steward, A. C. Beals, for some of his work with birds at Fort Macon, another "arrangement" that surely lacked either the knowledge or blessing of the fort's commanding officer. About Beals, Coues wrote to Baird that "on general principles he is a numbskull," but he praised his aide for learning to "skin first rate" the birds dying for science on Bogue Banks. Coues played his hand skillfully. He requested and received from Baird labels printed with "Hosp. Stew. A. C. Beals," and the assistant thereafter proudly attached the tags to the specimens he prepared. The impressionable Beals was "extra duly delighted" with this recognition, from which he no doubt gained further enthusiasm for his extraordinary tasks for Surgeon Coues.

Duty at Fort Macon was not without its drawbacks. In the years following the Civil War, the casemates housed both civil and military prisoners, and the living conditions for everyone often were rather miserable. Ticks plagued the men and, while the summer winds helped reduce the annoyance of mosquitoes, Coues also wrote of malaria wafting from swamps on the mainland. The festoons of Spanish moss, he asserted, were "an infallible index" of the disease lurking just across Bogue Sound.

Coues was particularly outraged at the fort's accommodations, most especially the 12-bed hospital, a frame building he described as "a disgrace to the service." Wind and rain swept freely through openings in the roof, and the building's foundations gave way in all directions atop the sandhill on which it perched. The hospital was so decrepit that "no possible repair will fit the building for hospital purposes." And space was no better; Coues' scant office measured little more than 8 by 9 feet. Twice daily the prisoners carried "all slops and garbage" far out on the beach for gleaning by birds and crabs; the tide took care of the remainder. Nonetheless, Coues dutifully reported "the most wholesome regulations [regarding sanitation] have always been enforced since I have been at the post." And his regard of Fort Macon as an outdoor laboratory remained undiminished. "It is a good place for natural history," he wrote a colleague, "but

JACK DERMID

***Coues recorded** that yellow-rumped warblers were abundant visitors to the seashore near Fort Macon. This species is sometimes called the myrtle warbler, no doubt because of its fondness for the seeds of the wax myrtle.*



JACK DERMID

***The beaches near** Fort Macon have long been a breeding ground for horseshoe crabs, and large numbers of this primitive creature spawn nearby in May. Migrating seabirds are attracted to the area and feed heavily on the eggs.*

exceedingly uncomfortable and disagreeable in other respects."

If the physical plant at Fort Macon was unpleasant for Coues, his view of the sea certainly was not. Coues wrote eloquently in *Sea-side Homes And What Lived in Them* of "... a low island on the Carolina coast ... along a foamy line, against waves that ceaselessly advance ... a sea-front flanked with sand-works [beyond which lies a] growth of reeds that rustle and surge with every breath of wind." With these words he introduced his memoir for two birds, the least tern and Wilson's plover. Coues recorded the least tern as "the most abundant tern of all," but before the century's end, plume hunters had nearly exterminated least terns from North Carolina. Their wing feathers were just right for women's hats, and the slaughter at one nesting area alone furnished 10,000 skins to feminine fashion in a single season! Today plume hunting is just a bad memory, and least terns once again grace North Carolina's beachfronts.

As noted, Coues' interest in birds at times was subordinated to other creatures. While at Fort Macon he turned his pen to marsh rabbits (he called them hares), a species he considered "the most abundant and characteristic mammal of the island." His work, appearing in the *Proceedings* of the Boston Society of Natural History, offers an example of Couesian science. He provided a description of the rabbits, their distribution, observations on habitat, gait, differences from cottontails and other species (including the western jackrabbits, which he no doubt recalled from Fort Whipple), and external parasites. He capped this work with arcane details of the skull structure, described with a surgeon's eye for detail.

Fittingly, today a nature trail at Fort Macon State Park is named in honor of Elliot Coues. In winter, the shrubs along the trail teem with yellow-rumped warblers, one of the few species of its kind that end their fall migration well north of more tropical climates. Once known as myrtle warblers, these delightful little birds feed hungrily on the bluish rock-hard seeds of wax myrtles, and true to their name, the base of their tails bears a conspicuous yellow patch.

Not all birds are so aptly named, however. Coues mentioned the prairie warbler several times in his papers, and not always strictly in terms of natural history. Prairie warblers, despite their name, seldom visit grasslands but instead favor open brushy areas not unlike the seaside scrublands surrounding Fort Macon. The misnomer occurred when the "father" of American ornithology, Alexander Wilson, encountered the species in 1810 in the barrens of southwestern Kentucky, an area locally known as "prairie country." The name stuck when Wilson wrote his description of the species, and the likes of Audubon—and Coues—continued using the misleading name. In his 791-page volume *The Birds of the Northwest*, written several years after he left Fort Macon, Coues' description of the prairie warbler included an acerbic reference to his previous post: "They were the only Warblers that showed bad taste enough to come voluntarily about Fort Macon in any considerable numbers." Here Coues' enmity for the fort got the better of his scientific judgment, for he earlier had recorded that yellow-rumped warblers were "very abundant in winter" at Fort Macon.

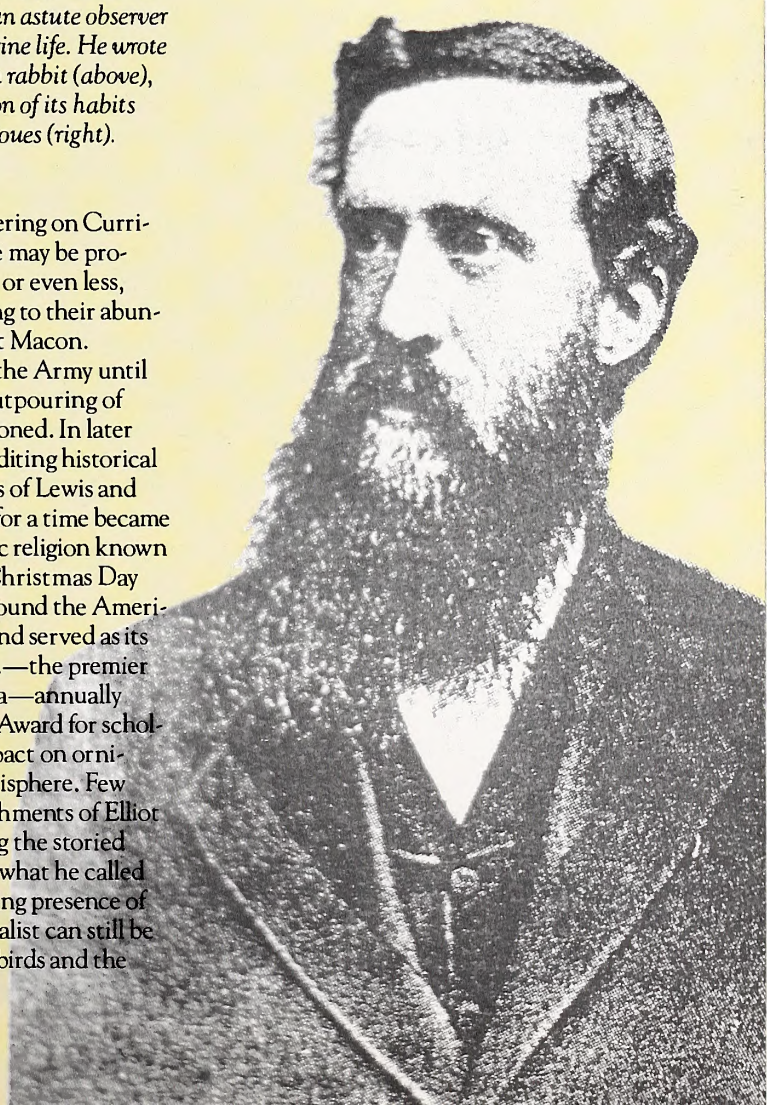
Coues had for some time coveted a position with the Smithsonian, and he wrote to Baird, "Isn't there *any* chance of my being able to get a Washington station as soon as I've squeezed Macon a little drier." A position at the nation's museum never materialized for Coues, but the fruits of his "squeezings" included *Notes on the Natural History of Fort Macon, N.C. and Vicinity*, published in five parts. The first installment treated the mam-

mals, reptiles and, of course, the birds. In the second, Coues turned his attention to crabs, shellfish and other marine invertebrates. Another physician-naturalist and Coues' successor at Fort Macon, Dr. H. C. Yarrow, published the third in the series, this one limited to fishes. Coues and Yarrow, in fact, switched positions, with Coues being posted at Fort McHenry, Md., in 1870 and Yarrow taking over at Fort Macon. The two men collaborated on the fourth and fifth papers, the first of which updated and revised Coues' earlier efforts with birds, mammals, and reptiles; the last in the series concerned the area's crustaceans. Their work included brief mention of ivory-billed woodpeckers reported near the fort, probably on the mainland. In 1809, Alexander Wilson had shot such a bird at Scotts Hill enroute to Wilmington, a site record that still stands as the northernmost location for the species because, for once, Coues had not used his shotgun to authenticate his notations at Fort Macon with a voucher specimen. Today ivorybills are probably extinct in the United States, although rumors linger about a few birds secluded in Louisiana, and some may persist in Cuba.

Horseshoe crabs were among the marine invertebrates catching the notice of Coues at Fort Macon. In May, large numbers of this unusual species—which isn't a true crab—spawn in shallow water. Coues watched hundreds of egg-laden females breeding in the shallows near the fort. Today we know that each female may lay 80,000 eggs, and where these sea creatures are unusually abundant, there may be 50 clutches in little more than a square yard! Concurrently, the age-old northward migration of millions of shorebirds occurs in May. One of these is the ruddy turnstone, which Coues recorded at Fort Macon as "very common during migration." Famished by their long flight from South America, the shorebirds rapidly fatten their lean bodies on the rich bounty of crab eggs, some actually doubling their weight in two weeks. To account for such gains, some estimates suggest that a single shorebird probably eats about 135,000 horseshoe crab eggs. Thus, a flock of 50,000 birds might consume 27 tons of eggs. Breeding areas for horseshoe crabs thus are crucial for shorebirds, and at least one such site on the Atlantic coast now is protected for this reason.

The numbers of waterfowl "that throng the sinuosities of the coast in winter are simply incalculable," which Coues attributed not only to a "congenial latitude [and] abundant supply of food," but also to the "incessant and systematic persecution they suffer somewhat further north." The persecution was market hunting, a practice not outlawed completely until the early 20th century and one that Coues undoubtedly knew was taking a heavy toll on those waterfowl wintering on Currituck Sound. Even so, "Geese may be procured, in season, for a dollar, or even less, apiece; a fact of itself attesting to their abundance" in the vicinity of Fort Macon.

MELISSA McGAW



***Although best** known as an ornithologist, Coues was also an astute observer of mammals and marine life. He wrote in detail on the marsh rabbit (above), providing a description of its habits and habitat. Elliot Coues (right).*

Elliot Coues remained in the Army until 1881, continuing a steady outpouring of papers wherever he was stationed. In later life he turned his talents to editing historical works, including the journals of Lewis and Clark. Along the way Coues for a time became deeply involved with a mystic religion known as Theosophy. He died on Christmas Day 1899, having earlier helped found the American Ornithologists' Union and served as its president. Today the A.O.U.—the premier society of its kind in America—annually issues the prestigious Coues Award for scholarly work having a major impact on ornithology in the Western Hemisphere. Few have matched the accomplishments of Elliot Coues, and for those visiting the storied ramparts of Fort Macon, on what he called a "mere sandbar," the lingering presence of this famous American naturalist can still be sensed in the cries of the seabirds and the rustling of the reeds. ⊡

# LIVING AT THE LIGHTHOUSE

## Rany Jennette was born in the shadow of the Hatteras Light, and as a park ranger at the age of 73 he still maintains his family's tradition.

written by Sarah Friday ©1994
photographed by Melissa McGaw

In 1932 Hatteras Island seemed a long way from nowhere. It took a day just to go 12 miles from Buxton to Hatteras, even chasing fast, wild horses.

But to Rany Jennette, age 11 then, the isolated cape with wide, flat beaches was the center of the world. His father, Unaka, lit the lighthouse that guided ships across the most treacherous mass of shoal and sea along the entire East Coast.

From 1921 to 1933, the young Jennette rode the beaches like a cowboy, ate beans with itinerant fishermen and fell asleep to the flashing white beam slicing through the night.

"It was a great life," Jennette, 73, says today. "There's no doubt about it. We didn't miss anything, because we had nothing to miss."

Jennette tells the story again—of a boy, his father and the light that keeps calling him home—to a crowd gathered on the porch of the Double Keeper's Quarters in the shadow of the Cape Hatteras Lighthouse.

"I was born in the house next door," he tells them. "My father was the last principal keeper here."

Mouths drop as visitors turn their heads toward the white two-story building covered in scaffolding now. In a way, the words still surprise Jennette, too, who never figured he would be working right next door to his boyhood home.

Since 1986, Jennette has unfolded his childhood memories like a treasure map before visitors as a ranger with the Cape Hatteras National Seashore. In his gray and green uniform with the U.S. Park Service patch, the keeper's son brings history alive at North Carolina's most famous light.

"He's Mr. Lighthouse around here," says Danny Couch, a longtime friend from Buxton. "There's not a more accurate way to describe him than that.

"What he does is give tourists a sense of the seafaring heritage around here and how important it is," Couch adds. "He genuinely wants people to understand. No vanities. No ego. He wants you to know."

Jennette's story begins more than a century before the days he chased wild horses down the beach as a boy. His ancestors, four Jennett orphans (spelled without an "e" before the 1900s), sold the U.S. Lighthouse Service 4 acres for the first Cape Hatteras Light. The 90-foot sandstone beacon, built in 1802, routed as many as 150 ships a day through the Graveyard of the Atlantic.

The cape needed a light because the warm waters of the Gulf Stream collided with the cold, southbound Labrador Current there, creating constant turbulence and shifting underwater sandbars such as Diamond Shoals. Some 2,300 vessels never made it beyond them.

The cape needed lighthouse keepers, too. And Unaka Jennette was one of them. After serving as a Chesapeake boat pilot and an expert seaman on lightships and buoy tenders, "Captain Naka," as people called him, took the helm of the second Cape Hatteras Light in 1919.

The 208-foot candy-striped tower, built in 1870, was the "queen of the lighthouses," his son says, much fancier and taller than any ever built before. Three keepers—a principal and two assistants—manned the light, working 24 hours each, then taking 48 hours off.

Captain Naka's primary responsibility was to light the lamp a half hour before sunset and extinguish it before sunrise, Jennette recalls. The keeper had to stay awake all night and through storms to make sure the light burned continuously—1.4 seconds on and 6 seconds off. If the light went out, he could lose his job. It never did.

To light the lamp, Unaka, a native of Buxton, carried 5 gallons of kerosene up the 268 iron steps each night. A first-order Fresnel lens, made up of more than 1,000 glass prisms, magnified the kerosene light into a beam visible for 20 miles. A weight system suspended through the heart of the tower controlled the len's rotation and flashing pattern.

For $157 a month, Unaka kept up the light and grounds, painted, farmed, drove islanders to the doctor, and escorted guests and family up the tower. Visitors came on Sundays, mostly. On busy days he might lead as many as seven or eight parties to the top.

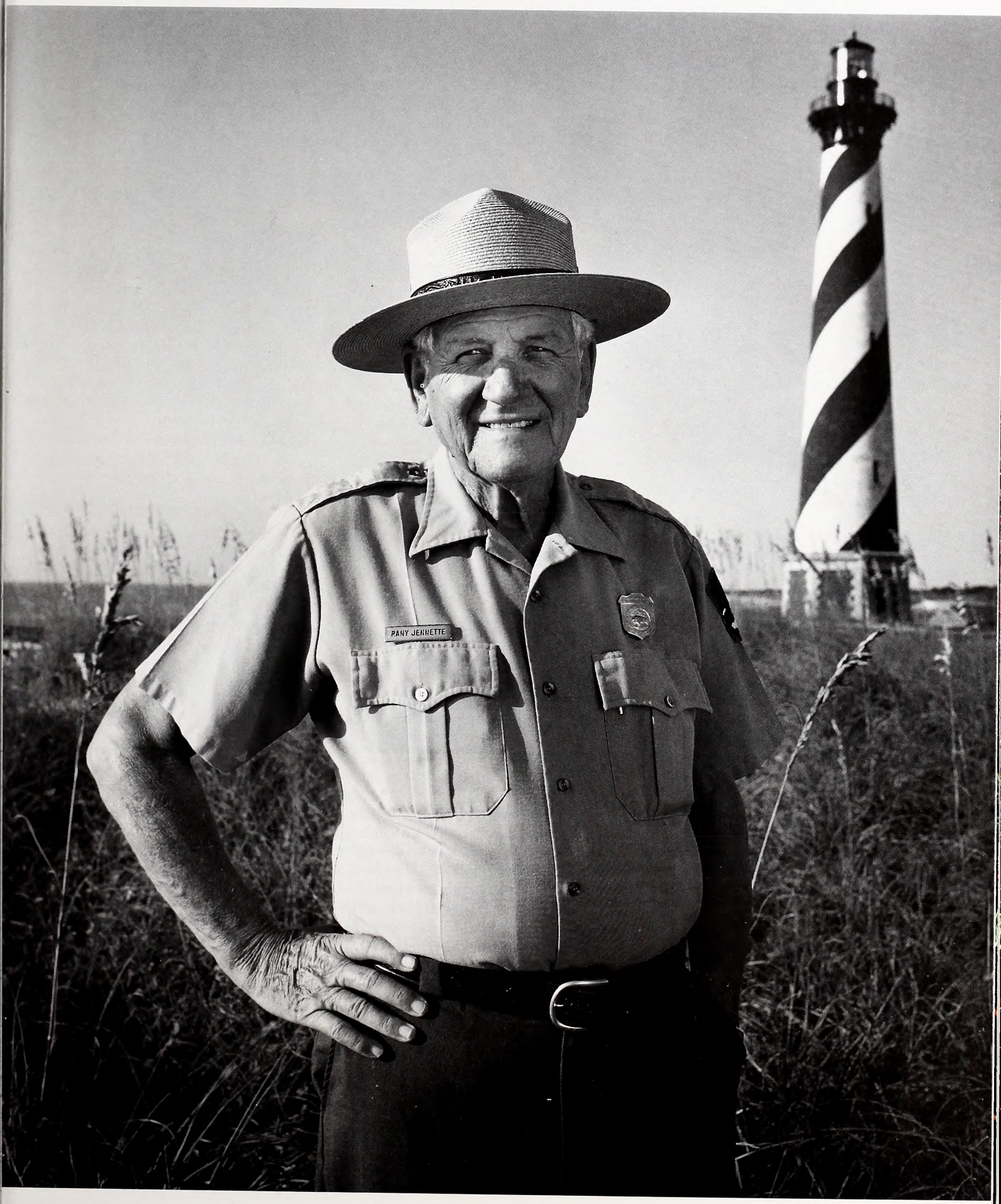
"I guess the first time I ever went up the lighthouse he carried me—my sister, Myrtle, and I," Jennette recalls. "We used to have a picture where he had one in one arm and one in the other. There was only 18 months difference between us."

As the middle of seven children, Rany, born in 1921, had plenty of playmates. His brother, Almy, who was 8 years older, joined the U.S. Navy at 17 and moved away. But five sisters—Vivian, Myrtle, Olive, Dorcas and Ramona—and a dozen or so other keepers' children explored the island together like bands of adventurous pirates.

In the 1920s and 1930s, North Carolina's barrier island beaches stretched wide and flat. No fort of dunes was needed to guard the nation's tallest brick lighthouse then. Herds of cattle, horses, sheep, goats and pigs roamed free. And a large freshwater pond filled the keepers' backyard. Near the houses stood a coal bin, storehouses, a summer kitchen, a "three-holer" outdoor privy and a garage for one of the coast's rare automobiles, usually a Chevrolet or a Chrysler, Jennette recalls.

Keepers' families played croquet with a passion on the green grass and clover circling the lighthouse. Boys chased frogs in the pond, shot marbles and hit baseballs every chance they got. Girls made paper dolls from old Sears, Roebuck and Co. catalogs and helped around the house. In the summer, folks swam and went "belly surfing." They collected shells, too, creating a game Jennette often

***Rany Jennette** was born in the shadow of the Cape Hatteras Light 73 years ago, and remembers a childhood when he explored the wild barrier island on his favorite pony and belly-surfed in the Atlantic. His father carried him under his arm on Rany's first trip to the top of the lighthouse.*


RANY JENNETTE

COURTESY OF RANY JENNETTE

***Much has changed** around the Cape Hatteras Light since this photograph was taken in 1932, but Rany Jennette likes to point out his wild pony with the golden mane in a group near the wagon tracks. "I called him 'Wildfire,'" recalls Jennette.*

YEAR OF THE COAST

shows visitors, in which different shells represent different animals. Olive shells are pigs; cockle shells, horses; and conchs or whelks, cows, for example.

Every six months, the national lighthouse service sent a library of about 200 books to lighthouse families. At night they read by kerosene lamp or played games like dominos and checkers—but no cards. Unaka was a staunch Methodist.

Beyond the lighthouse, Jennette's world followed the sand and sea.

School was a one-room building about 2 miles away in Buxton. Jennette graduated from there as valedictorian in 1938.

Another real part of his schooling came from riding the coast's sandy trails on horseback with his father and friends. Sometimes, he and his pals would trot by local fishing camps or the U.S. Coast Guard station and stop in for lunch and some heart-racing stories of the sea.

"The most worn out, exhausted, I've ever been in my life was chasing horses, wild horses, from Buxton to Hatteras Inlet," Jennette recalls. "Now that's 12 miles, all day long, just to get a chance to throw a rope over 'em. Cowboys you know, real cowboys."

By age 10, Jennette began riding roundups with his father on the back of their workhorse, Old Jim. He still has a quarter-size scar on his leg from the hard riding it took to corral his father's 40 cattle and 17 wild horses for the annual dipping to rid island livestock of ticks.

Jennette even had his own wild pony once. One of his father's mares had two identical colts, so he gave Almy one and Rany one.

"I called him 'Wildfire,'" Jennette recalls.

The white-haired cowboy with the sea-blue eyes can still point out his carrot-colored colt with the white mane and tail on a 1932 aerial photograph on the mantel in his living room.

Most of what Jennette learned about life back then his father taught him. Even now,

people who knew the kindhearted keeper say his son looks and acts just like him.

"When you're a kid, you try to do everything your daddy does," the ranger says. "He was the person I worshipped, so I stayed with him. And if he didn't take me with him I let him know about it.

"As far as personality, he was a very mild person," Jennette says. "I never saw him lose his temper. He was just a gentle man.

"He had a way of dealing with people and not making them mad or making an enemy," he adds. "I guess maybe that's the reason he was there 20 years, and longer than any other keeper."

The young Jennette followed his father to the garden, where the keepers grew most of their food. Beets, cucumbers, corn, cabbage, collards and other vegetables flourished in the soil fertilized by free-ranging livestock.

He followed his father's footsteps up the Cape Hatteras Light, too, helping out at an early age.

"As kids, we would do a lot of shining the brass," Jennette recalls. "The doorknobs are all brass and highly polished. And up in the lighthouse they had brass . . . around the old lens mechanism where the prisms are."

Cleaning the prisms took several hours, wiping dirt and every fingerprint from 1,000 pieces of glass. Twice a year, they polished the light to a rare shine with a camel-hair brush and a powder called "jeweler's rouge."

Sometimes Unaka let Rany peer out "spy glasses" at passing ships from the top of the tower. "They would come so close I could see people walking around on deck," he recalls.

He cut old sheets in squares, too, to make little parachutes with weights to drop from the sky. But he remembers climbing the lighthouse late at night with his father best.

"At night, it was beautiful, the whole area was flooded with light," Jennette says. The prisms multiplied light everywhere. "You can't describe it. All you heard was a ticking like a grandfather clock. The whir of the governor (clock control) was so silent. And you could hear the lamp hissing, like a camping lantern."

The flashing beam lulled him to sleep in his second-story room in the Principal Keeper's Quarters. "We had moonlit nights out here every night," he adds.

Every now and then, a lighthouse superintendent from Washington, D.C., inspected the Hatteras light and its keepers. Once, just before a visit, the lighthouse, grounds and quarters appeared spotless. The furniture had even been aired out in the yard.

"A friend and I were playing in the lighthouse yard," Jennette recalls. "There was a vat of tar beside the granite steps . . . and, being summertime, it was fluid like paint. There was a paintbrush handy and also a stick nearby. We started painting the granite tiers," not stopping until all the tar was gone and the base of the lighthouse wore a solid black coat.

Just before Unaka left to pick up the inspector in Norfolk, Va., he saw the boys' mess.

"I am in a hurry to catch the last ferry and don't have time to deal with this now, but after the inspection is over we will talk about it," he told Rany.

Waiting was the hardest part, Jennette recalls. Days later, after the inspector had left, his father led him back to the tower.

"Do you see that?" he asked.

"Yes sir."

"Well, you are going to remember it the rest of your life, young man."

Almost 65 years later, Jennette does remember the sting of his father's leather strap very well. A stroke or two of the tar left on the lighthouse's granite base serves as a reminder, too.

Just as vividly, he recalls another story of his father more fondly.

Periodically, Unaka met huge iron ships called buoy tenders in the middle of Pamlico Sound to take inventory of supplies to be brought ashore. Usually he hired a gas-powered boat to take him there. Sometimes he took Rany along.

"Pamlico Sound can get real mean," Jennette recalls. "And I remember this one time we went out, it was just about as rough as the Atlantic Ocean."

When they reached the large, still ship, their flailing 30-foot boat bucked like a Hatteras Island wild pony.

"The one we're on is going up, up, up and down, down, down," he tells. "And here I am about 9, 10 years old. And when the boat goes up, my father, who at that time was about a 45-year-old man, comes up and grabs the rail and pulls himself aboard . . . .Then he says, 'OK son, get on the cabin, and when she comes up again, I'll reach over the rail. Put your arms up and I'll pull you aboard.

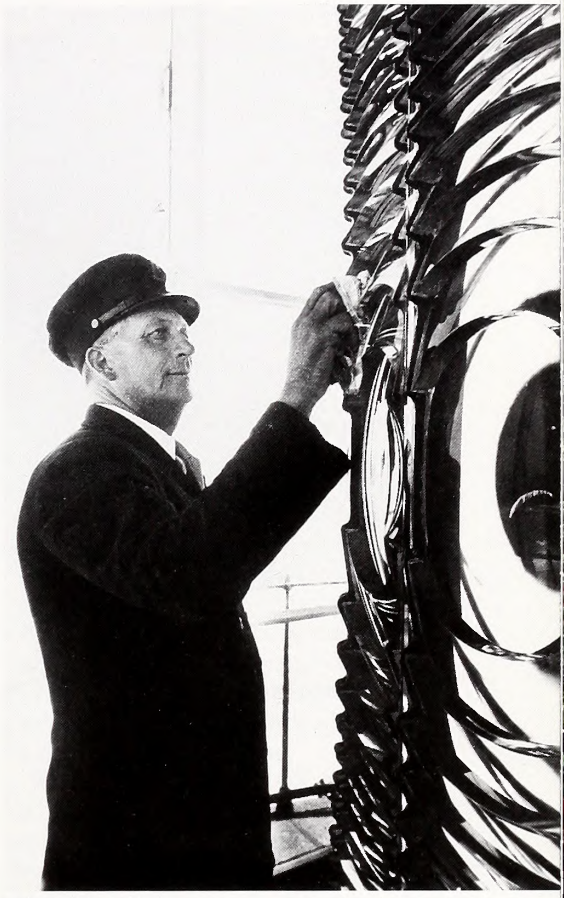
"That's what I did," Jennette says. "I put my little arms up and those big hands grabbed me and pulled me aboard.

"The point I'm trying to make is, I had no fear whatsoever that he was going to let me go. That is a leap of faith, OK? Those big hands, those little arms. That is one of my favorite memories."

A hurricane in August of 1933, and another in September, washed away the chance of any other memories being made in the shadow of the Cape Hatteras Light.

Winds reached 125 miles per hour during the second, and roughest, storm, and Jennette remembers his father and the other keepers riding it out in the base of the lighthouse.

"A lighthouse keeper never leaves his station for any reason," he says. "The sea was so powerful it busted down the doors of our house and flooded the whole first floor. It ruined all our furniture and the place just wasn't livable anymore."



COURTESY OF RANY JENNETTE

***Rany Jennette's** father was Unaka Jennette, shown here polishing the Fresnel lens in the light. Captain "Naka" became keeper in 1919, and each night would carry 5 gallons of kerosene up the 268 steps to light the flame visible for 20 miles.*

The family moved to Buxton, then to Unaka's brother's house in Maryland for a while. Unaka stayed, working a nearby light until the Coast Guard took over the nation's lighthouses in 1939.

During the next 30 years, Rany Jennette circled the globe with the Coast Guard and as a member of the engineering crew on the ship "Oceanographer." He returned to Cape Hatteras in 1956 to run a service station, and in 1970 to manage Buxton's water system. He retired in 1983 and three years later joined the park service.

Now, on the porch of the Double Keeper's Quarters, in the shadow of the Cape Hatteras Light, he tells the stories again of a boy, his father and the lighthouse that keeps calling him home.

"It's deja vu," Jennette says. "I feel the importance of it more every year I'm here. I feel I have a purpose." ⊡

# Hunting at School

***Tournaments** provide graduates from hunter education classes the opportunity to test their skills. While safety is stressed, students also learn marksmanship, ethics, outdoor survival skills and principles of sound wildlife management.*

Not all weapons at school spell trouble. The Wildlife Commission's hunter education courses and tournaments highlight the most successful school program in the nation with over 525,000 graduates.

written by Michael Faw
photographed by Ken Taylor

As Southwestern Randolph High School junior Brad Foley stood at the line and drew an arrow, the center of the bull's-eye target glowed like the setting midsummer sun. He settled down and aimed carefully, pausing until everything was in focus, then released the arrow. It flew straight and true, landing in the center of the bull's-eye 25 yards down range. It was a feat he would perform over and over that day.

Brad was competing against hundreds of students from middle and senior high schools across North Carolina at the N.C. Wildlife Resources Commission's State Hunter Education Tournament. At the end of the day, Brad's final scores revealed that he had become the first-place archer in the competition with a near-perfect, almost unheard of, score of 199 out of a possible 200-point total. His hours of backyard afterschool practice had paid off, winning him a trophy as the top archer in the state.

The long series of events that allowed him to compete in the Wildlife Commission's Hunter Education Tournament actually began months earlier when his high school agriculture teacher, Kenneth Rogers, began instructing the hunter education course for his students. From there, students who completed the course and passed the final exam were allowed to try out for the school's FFA hunter education team.

Like any sports team, the hunter education team practiced after school—except they used rifles, shotguns and bows instead of basketballs and footballs. In addition, the team members learned to use a compass, became skilled at wildlife identification and studied game laws. Team members who completed the months of practice were given their first challenge when they met other hunter education teams from all over the Wildlife Commission's District 5 region for the district tournament held in Siler City. The top teams, including the Southwestern Randolph High School team, qualified to compete in the state tournament held in Salisbury.

While these local and state competitions continue each year, many North Carolina teams have advanced to national competitions, even winning numerous national championships. Forbush High School from the Winston-Salem area has been a dominant force at the national level for years and has won the first-place national title three years. A place on the Forbush hunter education team garners as much respect as many other schools give their key football players.

Everyone who has attended one of the nine regional tournaments or the state Hunter Education Tournament can see the enthusiasm generated as students from area high schools compete to become recognized as some of the best and safest hunters in the state. The tournaments are an outgrowth of the Wildlife Commission's Hunter Education Program.

When the hunter education program began in 1971, attendance was voluntary and only 324 students completed the course. However, by the 1983-84 fiscal year, a record 33,302 students completed the course. Since July 1, 1991, the law mandates that anyone wishing to buy a North Carolina hunting license must either have passed the state's certified hunter safety course or show that they owned a hunting license before July 1, 1991. During the recent 1992-93 fiscal year, 23,887 students were trained in the course and 22,120 successfully passed the final exam. To date, over 525,000 students have been trained in hunter education classes.

The course requires 10 hours of classroom instruction and must be taught by an instructor who is certified by the Commission. Additional requirements are that the student be at least 12 years of age, attend all 10 hours of instruction and score at least 70 on the final written examination.

The scope of the Commission's hunter education program goes well beyond pure hunting topics. In addition to learning about how to safely handle all basic firearms while hunting or shooting, students learn about wildlife conservation and management, game laws, wildlife identification, first aid and water safety. Students watch videos, see demonstrations of various hunting equipment and use an 88-page hunter education manual. There is no charge for the course or materials as the cost is paid by sportsmen through a self-imposed excise tax on firearms, ammunition and archery equipment. Plans are currently under way to upgrade many of the visual aids and purchase shotguns and skeet throwers with funding provided by the National Rifle Association.

North Carolina's Hunter Education program has proven very successful and popular. States as far away as Oregon have looked to the Commission for assistance and guidance in establishing their courses and requirements. Massachusetts' personnel, for instance, recently contacted North Carolina for information as they worked to pass a hunter education law. The North Carolina hunter education program has received numerous awards from conservation groups.

Several schools are considering making the course mandatory in school to reduce school violence. One videotape used in the course depicts a hunter injured with a shotgun in an accident. The graphics and emergency room scene leave a chilling impression on all who view it.

While a majority of schools across North Carolina offer the hunter education course as part of agriculture or physical education classes, some schools do not. For students in those areas wishing to take the course, there is a well-established cadre of volunteer instructors who hold classes during the evenings and on weekends. Many of these courses are held at community colleges or at county Cooperative Extension Service headquarters. Local sporting goods stores and archery shops also sponsor courses prior to hunting seasons.

Volunteer hunter education instructor Tom Wassack in Randolph County typifies the dedication and professionalism of the Commission's 1,500 volunteer instructors. Last season he taught 13 courses and donated over 156 manhours to the program. While preparing for and teaching the course Wassack drove an estimated 1,200 miles, saving the Commission considerable manpower and vehicle expenses. He frequently teaches courses along with volunteer instructors Darrell Rogers and John Hopkins.

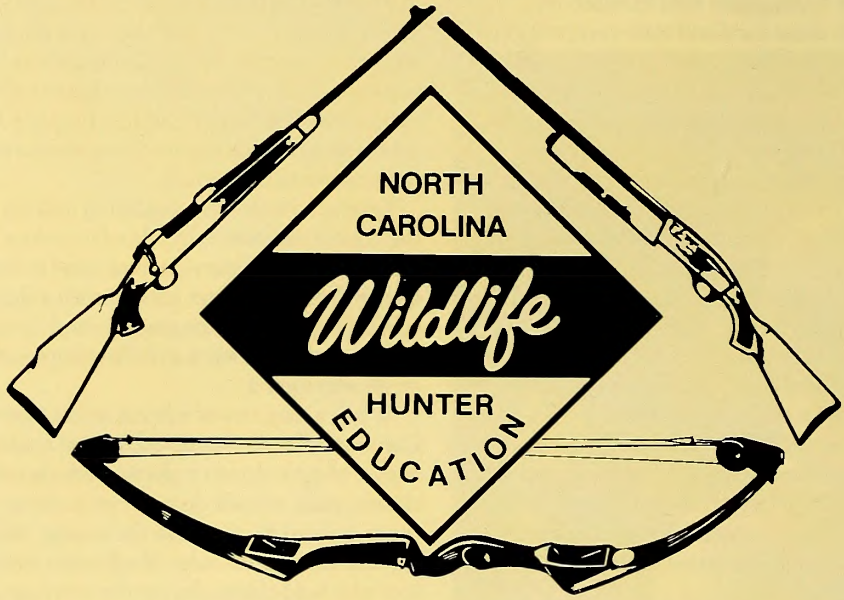
"I want to give something back to the sport," he explains. "As an avid waterfowler and turkey hunter, I greatly enjoy my time afield and consider hunting as one of this country's most cherished traditions." Students of all ages and even hunters with years of hunting experience have approached him at the end of a course and told him they learned something by taking it. Another of Wassack's contributions is a master checksheet that assists other instructors with documenting a student's proficiency in handling firearms safely during the course.

Other volunteer instructors have received

## To Become a Volunteer Instructor

According to N.C. Wildlife Resources Commission hunting and boating safety coordinator Lt. Randy Thomas, each applicant must complete an application form and pass a background investigation by Commission enforcement officers. Applicants are then contacted about an instructor course and must attend the 12-hour course and complete a test. Range time may also be included in addition to the classroom work.

For more information about courses scheduled in your area or for instructions on how to become a hunter education volunteer instructor, call the N.C. Wildlife Resources Commission's Hunter Education Division at (919) 733-7191 during regular office hours.



as much recognition as the program itself. Volunteer John Hopkins of High Point was named Instructor of the Year for the entire United States by Winchester. Hopkins has been instructing since 1976, has taught over 60 courses and has worked at almost every state tournament since his first year as a teacher. He also designed a computer program to help track participants at hunter education tournaments and tabulate the final scores for awards. Last year, he drove to Raleigh and donated a day of labor at the Commission's highly popular BB gun range during the N.C. State Fair.

What is involved in establishing a course? Local wildlife enforcement officers from all across the state begin preparations months before the course, working with volunteer instructors to set a date and location. This information is placed on a master scheduling list, and as the beginning date draws near, potential students are informed about the course. Many sporting goods stores and community colleges across North Carolina post notices that provide information about the pending courses. Wildlife Commission enforcement officers play a major role in coordinating and planning the classes. Each district provides course manuals, materials and firearms for the classes, and individual officers attend classes to answer questions and assist with instruction as needed. During the weeks prior to hunting season, courses are overflowing and wildlife enforcement officers log many miles and hours transporting materials to and from courses.

The requirements for firearms safety handling are very specific. A student must demonstrate to the satisfaction of the instructor that he or she can safely operate all of the five different basic firearms actions—pump, bolt, semiauto, breech-opening and lever—and locate and operate the safety on all the weapons used in the course. Other requirements for course completion are knowledge of how to carry a firearm safely in the field, cross a fence with a firearm and safely transport firearms in a vehicle. A final requirement states that "Any student who either intentionally or unintentionally points a firearm at another person or at himself shall fail the course and must re-enroll at a later date." Both volunteer instructors Tom Wassack and John Hopkins indicate they have had to disqualify students for violating this basic requirement, though the occurrence is quite rare. Despite all of the

***Hunter education** tournaments feature events with rifles, shotguns and bows and arrows. Several teams from North Carolina have consistently won national hunter safety tournaments in recent years.*

handling of firearms in the classroom, there has never been an injury during a hunter safety course or tournament in the state.

The firearms that are used have come primarily from local courts where a judge has ruled that a firearm used during a wildlife violation is to be turned over to the Commission's hunter education program. The firearm is then taken to a gunsmith and the firing mechanism is disabled. Even with such a large number of firearms statewide, there is still a shortage for use in hunter education classes during the peak demand just prior to the start of the hunting season in September.

After a student successfully completes the hunter education course, he or she is issued a wallet-sized card with a student ID number. If the card is lost, the student can submit information and pay a fee of $2 to the Commission's headquarters in Raleigh and receive a duplicate. These student cards are recognized and honored in all 50 states.

Many states are now requiring a separate hunter education course that specifically covers archery and bow hunting. To prepare for this demand from sportsmen, the Commission last year certified over 40 officers from each of the Commission's nine districts to instruct the International Bowhunter Education course. The officers, who are certified to teach both the standard and archery hunter education courses, are available to assist archery clubs and sporting goods stores in establishing courses and instructing students. Plans are under way to certify more volunteer instructors under this program in the future.

While the hunter education program has served as a model for hunter education in other states, its most important function has been reducing the number of hunting and firearm accidents. In fiscal year 1964-65, there were a record 19 fatal hunting accidents in North Carolina. During the 1992-93 hunting season, that number dropped to a record low of only five fatal accidents. That is a safety record every sportsman in the state can be proud of, considering there were over 351,000 hunting licenses sold across North Carolina during the most recent recorded hunting season. Indeed, hunting is statistically one of the safest of all sports, and the future looks bright as this course continues to produce safe hunters.

***Certified volunteer** instructors play a major role in teaching hunter education classes. Thanks to their diligent work, hunting accidents and fatalities have dropped dramatically since North Carolina initiated a hunter education program in 1971.*

*Venison, Funds Needed*

# North Carolina Hunters for the Hungry Adds Meat Processors

*Written and Edited by Vic Venters*

The North Carolina Hunters for the Hungry campaign has expanded its efforts this year to include a host of additional meat processors. The two-year-old program provides hunter-donated, low-fat ground venison to needy citizens.

This year the program will be accepting donated venison at locations in Beaufort, Bertie, Cabarrus, Davidson, Guilford, Martin, Onslow, Stanly and Wake counties and will be distributing the meat in that geographic area. N.C. Hunters for the Hungry has been modeled on tremendously successful efforts in states like Texas and Virginia, where such organizations distribute hundreds of thousands of pounds of venison to needy citizens each winter. North Carolina organizers hope to later expand the effort across North Carolina in the future.

"I think it's important to stress that we don't have an agenda with this program," said Tacker LeCarpentier, a Raleigh attorney who is the one of the founders and co-chairs of the project. "Our sole purpose is to fight hunger in these areas by utilizing the renewable and plentiful natural resources of the state. We welcome all who wish to participate."

Numerous agencies and organizations are contributing to the project, including the N.C. Wildlife Resources Commission, the N.C. Wildlife Federation, the Wake County Wildlife Club, the N.C. Sportsmen's Alliance, Christ Episcopal Church of Raleigh, the Food Bank of N.C., the Albemarle Manna Food Bank, the Inter-faith Food Shuttle, the African American Fishing and Hunting Association, the N.C. Dept of Agriculture and the N.C. Department of Environment, Health and Natural Resources. The organization has non-profit status under the Food Bank of N.C. umbrella.

NORTH CAROLINA HUNTERS FOR THE HUNGRY

## *Taking Aim Against Hunger*

Hunters for the Hungry welcomes both venison donations or funds to help pay for processing costs. To make a tax deductible donation, or for more information on the program, contact N.C. Hunters for the Hungry, P.O. Box 10502, Raleigh, NC 27605-0502.

Listed below are the current meat processors where donated venison should be taken:

**Beaufort County**
*Lloyd's Custom Meats*
Hwy 264 East (8 miles east of Belhaven)
Belhaven, NC
(919) 943-2209
Mon.-Fri., 8 a.m.-12 p.m., 1 p.m.-5 p.m
After hours call (919) 943-2740

*Washington City Fire Dept.*
410 Market Street
Washington, NC 27889
(919) 946-1605, Before 8 p.m.

**Bertie County**
*Windsor City Fire Dept.*
501 N. King Street
Windsor, NC 27983
(919) 794-3437

**Cabarrus County**
*Cruse Meat Processing*
4701 Rimer Road
Concord, NC
(704) 786-8616
Tues.-Fri., 8 a.m.-5:30 p.m.
Sat. & Mon., 8 a.m.-1 p.m.

**Davidson County**
*Midway Meats, Inc.*
3282 Clodfelter Road
Winston-Salem, NC
(910) 764-2684
Mon.-Fri., 8 a.m.-5 p.m.

**Guilford County**
*Triad Meats*
201 Higgins St. (off S. Elm/Eugene St.)
Greensboro, NC 27406
(910) 275-5671
Mon.-Fri., 9 a.m.-6 p.m.
Sat., 9 a.m.- 5 p.m.

*Curtis Hayes*
1912 Harris Drive
Greensboro, NC
(910) 852-0026
(call before delivery)

**Martin County**
*Williamston City Fire Dept.*
901 Washington Street
Williamston, NC
(919) 792-3521, (before 10 p.m.)

**Nash/Edgecombe Counties**
*Ray Gay's Meat Sales & Processing*
RR 4, Box 83-A
(2 miles south of Rocky Mount on Old Wilson Rd.)
Rocky Mount, NC
(919) 446-9488
Mon.-Fri., 7 a.m.-5 p.m.

**Onslow County**
*Community Meat Center*
1710 Piney Green Rd.
Jacksonville, NC
(910) 353-4676
Mon.-Sat., 9 a.m.-7 p.m.

**Stanly County**
*South Stanly Packing Plant*
Rocky River Springs Road
Norwood, NC
(704) 474-4463
Mon.-Fri., 8 a.m.-4:30 p.m.
Sat., 8 a.m.-12 p.m.

*Thompson & Son*
1718 Blanch Ave.
Albemarle, NC
(704) 982-6946, work;
(704) 982-1298, home
Mon.-Fri., 8 a.m.-5 p.m.
After hours, call home number

**Wake County**
*Custom Meat Processing*
Johnny & Faith Stephens
963 Old Johnson Rd.
Wendell, NC
(919) 365-9406
Call for appointment and directions

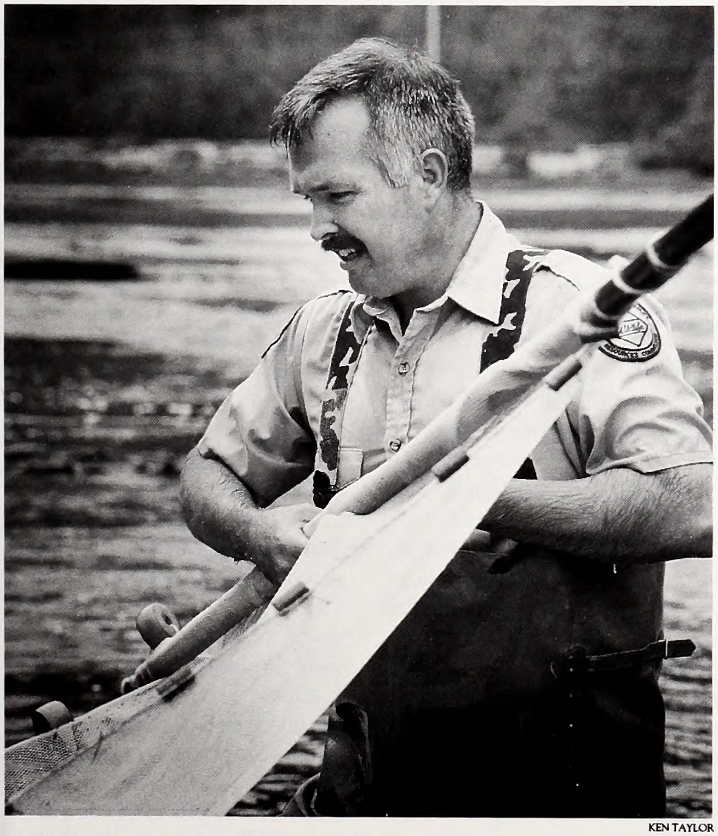
## *Work with Mollusks Cited*
## Commission Biologist Honored

A Wildlife Commission biologist has received a prestigious award from the southeastern chapter of The Wildlife Society, a professional organization made up of wildlife biologists.

John M. Alderman, the nongame and endangered wildlife program coordinator for the Piedmont, accepted the chapter's Wildlife Management Excellence Award in October at the Society's annual banquet. It is the Society's highest award and is given to the outstanding biologist in the Southeast.

Alderman, who began his career at the Wildlife Commission in 1984, has led efforts to conserve the freshwater mollusks of North Carolina and their habitats across the state. Since joining the Wildlife Commission, Alderman has greatly increased the biological understanding of North Carolina's freshwater mollusks, spending long hours surveying and identifying rare, threatened or endangered populations in small streams and obscure headwaters throughout the state.

"It's important to note that recent efforts at invertebrate conservation would not have come about without John's personal interest and dedication," said Randall Wilson, the section manager for the Wildlife Commission's Nongame and Endangered Species Program. "He has gone far beyond the call of normal duties in his efforts to save freshwater mollusks and the critical habitat that supports North Carolina's aquatic resources."



KEN TAYLOR

***Wildlife Commission** nongame biologist John Alderman recently received the prestigious Wildlife Management Excellence Award from the southeastern Chapter of The Wildlife Society.*

## The 1995 North Carolina Wildlife Calendar Is Here!

***"Leaping Brown"** by David Williams is one of 12 paintings featured in the 1995 North Carolina Wildlife Calendar. Order now before they're sold out.*

The works of James A. Brooks, Robert B. Dance, Robert C. Flowers, Jr., Bob Herr, Lee James, Cathy Kinlaw, Brooks Pearce, Duane Raver, Mel Steele and David Williams are featured in the 1995 Wildlife Calendar. Order yours today by returning the form below with your check or money order to 1995 Calendar, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

### ORDER TODAY!

Please send me _____ N.C. Wildlife Calendars (**C95**)
at $6.00 each $_____
All N.C. residents add $.36 sales tax per calendar _____
No sales tax for out of state residents.
Enclosed is my check for ..... Total $_____

☐ Charge my MasterCard or VISA for the calendar(s) ordered above. My card number is _____ and my expiration date is _____/_____

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Card holder signature | Day Time Phone No.

**If ordering 7 or more calendars, please provide your UPS deliverable address.**

Name _____
Address _____ Apt. # _____
City/State/Zip _____
Phone (_____) _____

Send order to: 1995 CALENDAR; N.C. Wildlife Resources Commission; 512 N. Salisbury Street; Raleigh, N.C. 27604-1188
Office located at: 322 Chapanoke Rd., Raleigh N.C.

All orders must be prepaid. We do not bill. A $20.00 charge will be made on returned checks (N.C.G.S. 25-3-512).

**For fund raising and bulk rate information (10 calendars or more), call 919-662-4377. Please allow 6 weeks for delivery.**

CALO95

*Populations Tracked by Avid Hunter Survey*

## Coastal Plain Quail Hunting Shows Some Improvement

Last year offered mixed success for North Carolina quail hunters, as measured by the Wildlife Resources Commission's Avid Quail Hunter Survey. The Coastal Plain saw slight increases in hunter success, while the Piedmont and Mountain Regions experienced slight declines.

Biologists can estimate quail population trends by tracking avid hunter success rates. The surveys have been conducted annually since 1984.

In the 1993-94 season, the 189 hunters participating in the survey reported flushing 6,968 coveys. On a statewide average hunters found 2.13 coveys per trip and harvested an average of 3.11 birds per party per trip.

Hunting success improved in North Carolina's Coastal Plain last year. In southern Coastal Plain counties, hunters flushed 1.9 coveys per trip last year, an increase from 1.65 coveys the prior year. In central Coastal Plain counties, the success rate jumped to 3 coveys encountered per trip, an increase from 2.74. In the northern Coastal Plain counties coveys found increased slightly to 2.6 per trip, up from 2.41.

Overall, hunting success in the Piedmont declined slightly. Last year, hunters in northern Piedmont counties found 1.5 coveys per trip, a slight decrease from 1.6 per trip in the previous year. A more substantial decline was noted in the central Piedmont—a drop of 1.2 coveys from 1.8. In the southern Piedmont, the covey flush rate remained the same at 1.6 coveys found per trip.

In the Mountains, quail hunting success declined slightly from 1992-93 to 1993-94. In the southern mountains, the average number of coveys found dropped from 1.6 to 1.2. In the northern Mountain counties, coveys found fell from 1.1 to .75 per trip.

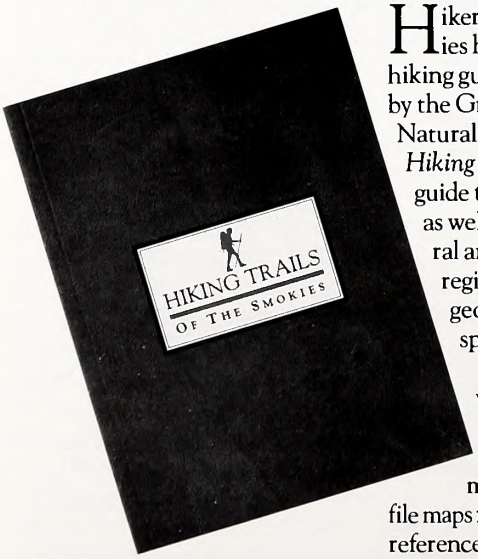
Terry Sharpe, the Wildlife Commission's small game project leader, predicts this summer may have been a good breeding season for quail in many areas. "I'm cautiously optimistic," Sharpe said. "Except for local areas that still experienced drought, weather was pretty good through late August. It was cooler and wetter than normal and I'll take that anyday over the mid-summer droughts we've had over much of the 1980s."

According to the Wildlife Commission's mail surveys, the number of quail hunters in the state has been halved over the last decade. In 1983-84, there were approximately 70,120 quail hunters in North Carolina. In the 1986-87 season, the number had dropped to an estimated 56,301 quail hunters. By 1989-90 season, there were only 46,644 quail hunters in the state and by the 1992-93 season that figure had dropped to 35,447, representing a 24 percent decline over a three-year period.

Quail hunters interested in participating in the Wildlife Commission's Avid Quail Hunter Survey should contact Terry Sharpe, Avid Hunter Survey Project, 317 Hamlet Ave., Hamlet, N.C. 28345.

*Features Maps and More*

## New Trail Guide Available for Great Smokies




Hikers headed for the Smokies have a new trail and hiking guide available. Published by the Great Smoky Mountains Natural History Association, *Hiking Trails of the Smokies* is a guide to the trails of the Park, as well as the attendant natural and human history of the region. Also included is the geology, flora and fauna specific to each trail.

The 576-page book was compiled by 15 local experts. The book features a full color park map and individual profile maps for all 149 trails. For quick reference, the trail narratives begin with a section that gives length, highlights, cautions, type of use and directions to the trailhead. Other sections cover such topics as back country ethics, safety and medical concerns, as well as recommended trail loops.

The book will be updated and reprinted regularly as circumstances warrant. A share of the proceeds from the sale of these publications goes to support the park's educational and scientific programs. The book can be purchased for $16.95 at park visitor's centers or can be ordered from the Great Smoky Mountains Natural History Association by calling (615) 436-7318.

## Calendar

On several occasions, events in this calendar have been changed without notice. Readers should check with the contact listed before traveling to an event. Listing for this calendar should be sent at least four months in advance.

**Nov. 5**

The N.C. Herpetological Society will hold its fall meeting on the campus of N.C. State University in Raleigh. The meeting's theme will be the ecology and conservation of the timber rattlesnake. All persons interested in reptiles or amphibians are welcome to attend. For more information, contact the N.C. Herpetological Society, N.C. State Museum of Natural Sciences, P.O. Box 29555, Raleigh, N.C. 27626, or call (919) 733-7450.

**Nov. 19**

Wildlife art auction at SciWorks, the Science Center and Environmental Park of Forsyth County, will feature the artwork of nationally acclaimed wildlife and nature artists. Paintings, drawings, sculpture and photography will be featured. Music, beverages and food are included in admission ticket. For more information, contact (910) 767-6730.

**Dec. 3-4**

The Seventh Annual Core Sound Decoy Festival will be held at the Harkers Island Elementary School on Harkers Island. Sponsored by the Core Sound Decoy Carvers Guild, the event has become the largest gathering for waterfowl enthusiasts in North Carolina. Demonstrations, carving and painting competitions, decoys, retriever demonstrations and waterfowl art will be featured. All proceeds will got toward the development of the Core Sound Waterfowl Museum. For more information, contact (919) 728-1500.

*Book Review*

## Essays From Janet Lembke: *Skinny Dipping*

*Skinny Dipping, by Janet Lembke, published by Lyons & Burford, New York, 1994; hardback, $21.95).*

A good essay is a lot like a slice of fruit cake—small enough to gobble in one sitting and with a lot of tasty things inside. It can also be like a journey to an unannounced destination. The fun is going along for the ride.

In three well-received books, naturalist Janet Lembke has given readers a series of polished essays, and her latest book, *Skinny Dipping*, is now out for our enjoyment.

Lembke is best known as a nature writer, finding most of her subject matter close to home on the lower Neuse River where she and her husband, the Chief, live. This collection includes more essays from North Carolina, plus a handful from the mountains of Virginia and even one based on a trip she took to New Zealand. All of them are linked by water and its transforming effects on the human spirit.

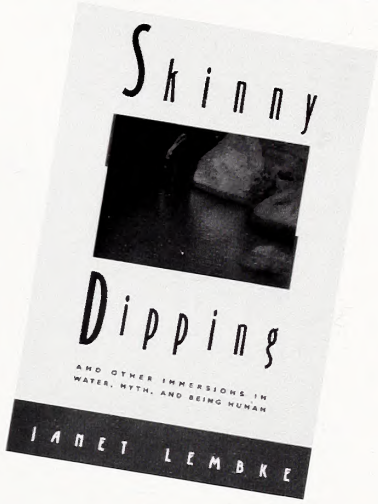
The title essay explores the sensuous mysteries of water on the bare flesh, but she finds in the urge to shed clothes a metaphor for a deeper engagement with the world. "... peeling sensibility down to the raw, new nakedness, is the only way to enter and be properly embraced by the world," she writes.

Another essay, "Ring a Ring o' Roses," begins with her simple search for the name of a nondescript rose growing wild on unkempt land upstream. She discovers that the roses are a cultivated variety, probably planted in the 1920s, that die back each winter and bloom again each spring. By the end, Lembke has explored fairy tale and magic, fossil roses and ancient Troy, and finally offers graceful reflections on nature's staying power and our own impermanence and decay.

Like other good essayists, her writing method begins with the germ of an observation, but broadens into myth and story. "The notion takes root and grows, leafing out, budding, beginning to flower, and all because a word has gone spinning through air like a seed," she writes, and she could well be describing how she writes.

Take a bite out of this rich fare. Go along for the ride.

*—Lawrence S. Earley*




### Field Notes

| | |
|---|---|
| Eastern Gun Deer | Through Jan. 2 |
| Central Bow and Arrow Deer | Ends Nov. 5 |
| Central Muzzleloading Deer | Nov. 7-Nov. 12 |
| Central Gun Deer | Nov. 14-Jan. 2 |
| Northwestern Bow and Arrow Deer | Ends Nov. 12 |
| Northwestern Muzzleloading Deer | Nov. 14-Nov. 19 |
| Northwestern Gun Deer | Nov. 21-Dec. 10 |
| Western Bow and Arrow Deer | Ends Nov. 19 |
| Western Gun Deer | Nov. 21-Dec. 10 |
| Black Bear | See *Regulations Digest* |
| Wild Boar | See *Regulations Digest* |
| Gray Squirrel | Ends Jan. 31 |
| Fox Squirrel | See *Regulations Digest* |
| Quail | Nov. 19-Feb. 28 |
| Rabbit | Nov. 19-Feb. 28 |
| Ruffed Grouse | Through Feb. 28 |
| Raccoon and Opossum | See *Regulations Digest* |
| Common Snipe | Nov. 14-Feb. 28 |
| Mourning Doves (middle season) | Nov. 21-Nov. 26 |
| Ducks, Mergansers and Coots (middle season) | Nov. 23-Nov. 26 |
| Brant (first season) | Nov. 23-Nov. 26 |
| Snow and Blue Geese | Through Feb. 10 |
| Sea Ducks | Through Jan. 20 |
| Tundra Swan (by permit only) | Nov. 3-Jan. 31 |

Information on bag limits, either-sex hunts, permits and other regulations may be found in the *1994-95 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission.

*May Be Rented by Other Museums*

## *WILD Places* Book Becomes Exhibit

A Wildlife Commission book has become the centerpiece of new statewide environmental education exhibit. A portion of the text and artwork from *North Carolina WILD Places: A Closer Look* is being exhibited this fall and winter by SciWorks, the Science and Environmental Park of Forsyth County.

*North Carolina WILD Places* features text and keyed illustrations for 13 North Carolina wildlife habitats. The exhibit is organized in the same manner as the book, highlighting unique habitat and the plants and animals found in them. It integrates the book's text and the illustrations of well-known nature illustrator, Anne Marshall Runyon, as well as keyed maps, hands-on artistry, natural history collections and live plant and animal specimens added by the SciWorks exhibit staff.

The exhibit features most of the illustrations used in the book. Four large state maps depict the physio-geographic areas of the state into Mountain, Piedmont, Coastal Plain and maritime habitats.

The exhibit has been designed to be portable so that it can be displayed at other museums and science centers. Beginning in the summer of 1995, the exhibit can be rented for three-month periods so that host organizations can develop the community program fully. The exhibit will require about 1,000 square feet of floor space, and can be set up easily.

For more details on exhibit rental, please call Dr. Ken Bridle, Director of Exhibits and Science Interpretation at SciWorks at (910) 767-6730.

*—Chris T. Pendleton, executive director, and Ken Bridle, director of exhibits and science interpretation, SciWorks, Winston-Salem*

## *Only a phone call away . . .*

Call **919-715-4091** anytime and use your MasterCard or VISA to purchase most hunting licenses, fishing licenses, or a subscription to *Wildlife in North Carolina* magazine.

LEONARD LEE RUE III

## Wildlife Endowment Fund Report

**August 1994**

Principal Balance
$20,048,422.78

Interest Earned
$15,535,551.78

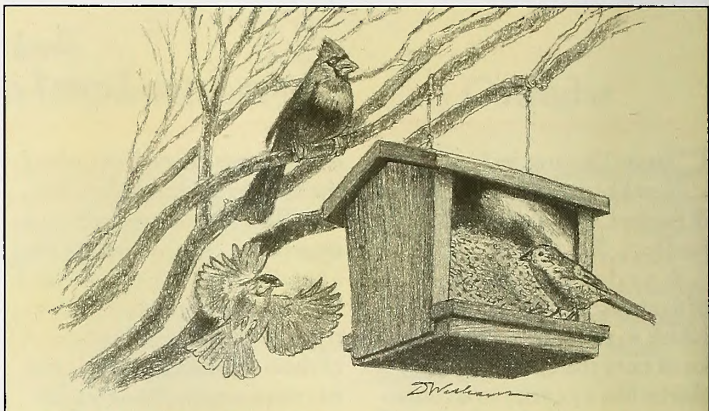
Total Receipts
$35,583,974.56

Interest Used
$7,410,551.48

Fund Balance
$28,173,423.08

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Help Fight Finch Eye Disease

*by Vic Venters*

A newly discovered disease that can be fatal to house finches is spreading into North Carolina and may affect the way you manage backyard bird feeders.

The disease, dubbed "finch eye," has been confirmed present in Mid-Atlantic states, including North Carolina. Finch eye appears as a type of conjunctivitis, which is an eye infection, although the disease also affects the upper respiratory system of the birds and can be fatal. At *Wildlife in North Carolina's* presstime, the disease appears to be confined solely to house finches, although there are some unconfirmed reports of infection in other finch species.

Infected finches may show swollen faces, runny or crusty eyes and sluggishness. Finch eye has been linked to poultry diseases, although researchers are still trying to understand its exact cause. Disease specialists say that finch eye is not contagious to humans.

Finch eye is apparently spread through droppings and may be exacerbated by heavy concentrations of birds at feeders. Scientists have offered two very disparate approaches for combating the disease. If infected finches are detected at feeders, the U.S. Fish and Wildlife Service has recommended that people remove the feeder immediately, clean it and stop feeding for a two week period. Ornithologists at the Cornell Laboratory of Ornithology, on the other hand, have speculated that if enough people stop feeding birds, it might promote dispersal of infected finches to new areas and hasten the spread of the disease.

What everyone agrees on is the need to clean and disinfect feeders regularly. Scrub feeders with a solution made from one part household bleach to nine parts hot water, rinsing thoroughly after cleaning. Always use fresh seed in feeders and regularly remove seeds and droppings from under a feeder. Another good idea is to establish several feeding stations in different locations in your yard and rotate feeders each week to different spots, thereby preventing a buildup of droppings and contaminated seed.

Information on this disease is evolving rapidly so keep an eye out for updated news in bird magazines or your newspaper.

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## Farm Family

Bobwhite quail are still common in North Carolina, but their numbers are down. Some prime quail habitat is being destroyed, but more insidious is hopscotch development that leaves islands of habitat that are too isolated to support healthy wildlife populations.

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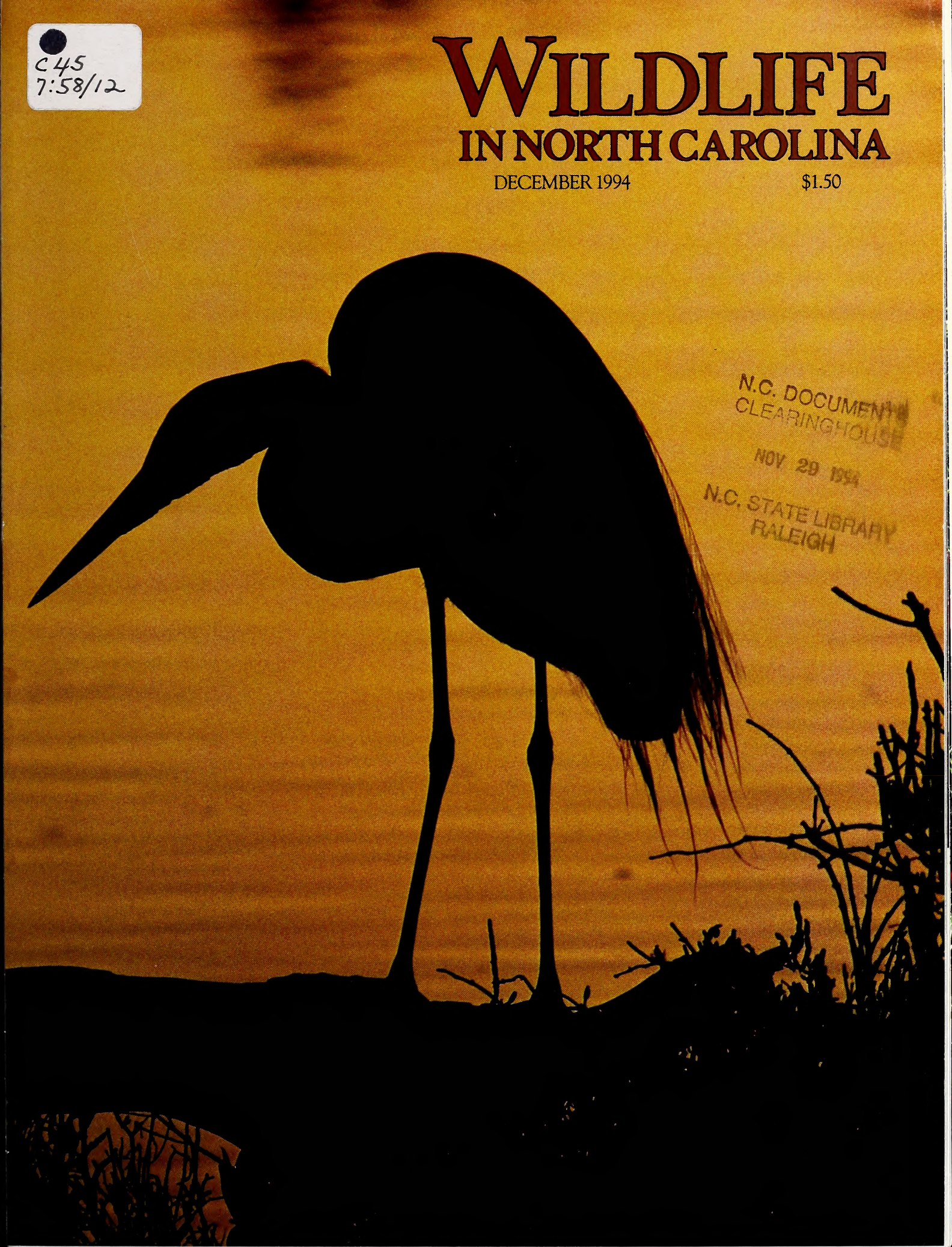

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# When Honeybuns Go Bad

*by Jim Dean*

"Save the best for last." It's an old, old saying that probably goes back to our Puritan roots, and may even have a more ancient origin—a Roman orgy comes to mind. Yielding to the fatuous natterings of flocks of forebears, we pre-war types have obediently saved the best for last for so many years that it would never occur to us to question the wisdom of delayed indulgence. Some of us have saved the "best" so long it's gone bad.

We wear old clothes while new ones gather mildew in the closet. We instinctively eat the broken cookies first and save the biggest with the most chocolate chips for last. We write thank-you notes on school notepaper, and save the good stationery—for what? If we're fortunate enough to have china, crystal or nice linens, do we use them regularly? Of course not. We eat off the chipped plates we bought with coupons at the grocery store, and drink out of plastic Durham Bulls' cups or chug from the jug straight out of the refrigerator.

ILLUSTRATION BY JACKIE PITTMAN

Of course, it is virtuous and satisfying to live a simple, frugal life. Someday, we will get a gold star (at least) if we keep squeezing all those little soap remnants together to make one squishy bar. Yet carried to extremes, this is an insidious habit, and those of us who hunt and fish are no less guilty. It is no coincidence that exceptionally fine bamboo fly rods or high quality guns—especially collectible shotguns—are called "closet queens." As for me, I'm still wearing my grandfather's hunting clothes. I broke in my boots at Ft. Knox 35 years ago, and I've still got the spare pair hanging in the basement, spit-shined and ready for inspection. I own boxes containing hundreds of virgin trout flies and bass bugs, yet I invariably choose to fish with a veteran, paint-chipped popper or a fly so thoroughly chewed and matted that it's virtually unrecognizable. I could go on and on (aren't you glad they give me only a page?).

You can, therefore, imagine my consternation when I recently read some advice offered by a man who had survived a shipwreck and drifted alone in a raft for weeks before being rescued.

"I knew I might not have long to live, and I wasn't going to shortchange myself," he said. "I had a small supply of food and water, and I rationed it to make it last. But each time I ate or drank anything, I picked not only the freshest food from the stock that was left, but also the stuff I liked most. That way, I was always eating the best I had. There wasn't much I could do while I was waiting to be rescued, but that little act of rebellion gave me some pleasure. Besides, if I had saved the best for last, I would have resigned myself to consuming the worst food right from the beginning, and even the stuff that had started out fresh would have been spoiled by the time I got around to it. It made no sense whatever."

Here is a man who has discovered a simple, myth-busting truth, and about time, too. We are all awash on that derelict raft we call life, and there are no guarantees that we will be afloat tomorrow. It's enough to make those of us on the cusp of geezerhood change our ways. After all, our kids already live by the modern rationale that "Life is short; eat dessert first."

I can't abandon all my bad habits, but I have been making a few modest changes. I've begun wearing my good suit pants for no particular reason (and I am training myself to accept this as the best reason). I'm drinking the good wine first—maybe I'll get lucky and someone else who outlives me can deal with the rotgut. I'm going for the most flawless apple in the basket, the crispest French fry on the plate and the freshest, most heavily-glazed Honeybun in the rack. The good guns are going afield this year, and vacation is over for those perfect popping bugs. What, after all, have I been saving them for?

It's not as easy as it sounds, and I'm sure to slip up occasionally. This fall, I caught myself tying on a previously-used Wulff Royal even though it was one of those bright fall days when the leaves are ablaze and the trout are on the move. Furthermore, I knew it might be my last trip of the season, or ever. "What are you doing?" I said to myself. "Here you are astream on the most glorious day of the year, and you're about to fish with the worst fly you own." I clipped off the old fly and replaced it with the most pristine and perfectly-proportioned Wulff in the box.

No doubt you've heard it said that "If you don't use it, you lose it." I know it's true because I once had a whole box of newly-tied trout flies eaten by moths.

Oh yes, about that battered old Wulff. Try as I might, I couldn't bring myself to throw it away. Instead, I put it in a corner of the box. It's possible that I might live long enough to get down to my last fly. If so, I'll have one.

December, 1994
Volume 58, Number 12

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# WILDLIFE IN NORTH CAROLINA

*Wildlife in North Carolina* is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of the State's wildlife and other interrelated natural resources and also to the environment we share with them.

## CONTENTS

4 **The Art of Calling** *written by Vic Venters*
*photographed by Melissa McGaw*
*Ever hear a guide call geese using only his mouth? It's part of North Carolina's waterfowl heritage, and explains why locally made calls are still rare here.*

8 **Southern Sourdough**
*written and photographed by Soc Clay* © 1994
*Outdoorsmen, camp cooks and native Southerners know that this wonderful bread didn't originate in Alaska. Try a batch during the holidays.*

12 **Symphony in Silhouette** *photographed by Derrick Hamrick* © 1994
*The natural world is like an orchestra; its best performances may be as memorable as they are unpredictable. Outdoors, one learns to anticipate the same exquisite, yet fortuitous grace in the slanting light of early morning or late afternoon. Photographer Derrick Hamrick conducts.*

18 **The Rock in Winter**
*written and photographed by Gerald Almy* © 1994
*A big rockfish on the line will warm you up in a hurry. Here are several techniques that will work for these stripers on North Carolina's lakes this winter.*

24 **Learning to Hunt** *written by Eddie Nickens* © 1994
*illustrated by David Williams* © 1994
*"These days, more than ever, learning how to hunt only begins with a gun."*

## DEPARTMENTS

**Our Natural Heritage** *by Jim Dean*
**Nature's Ways** *by Lawrence S. Earley*
**Back of the Book** *by Vic Venters*
**Wildlife Through the Year** *by Vic Venters*

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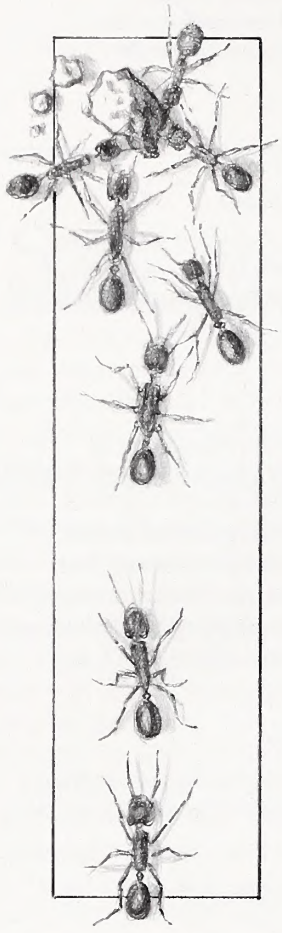
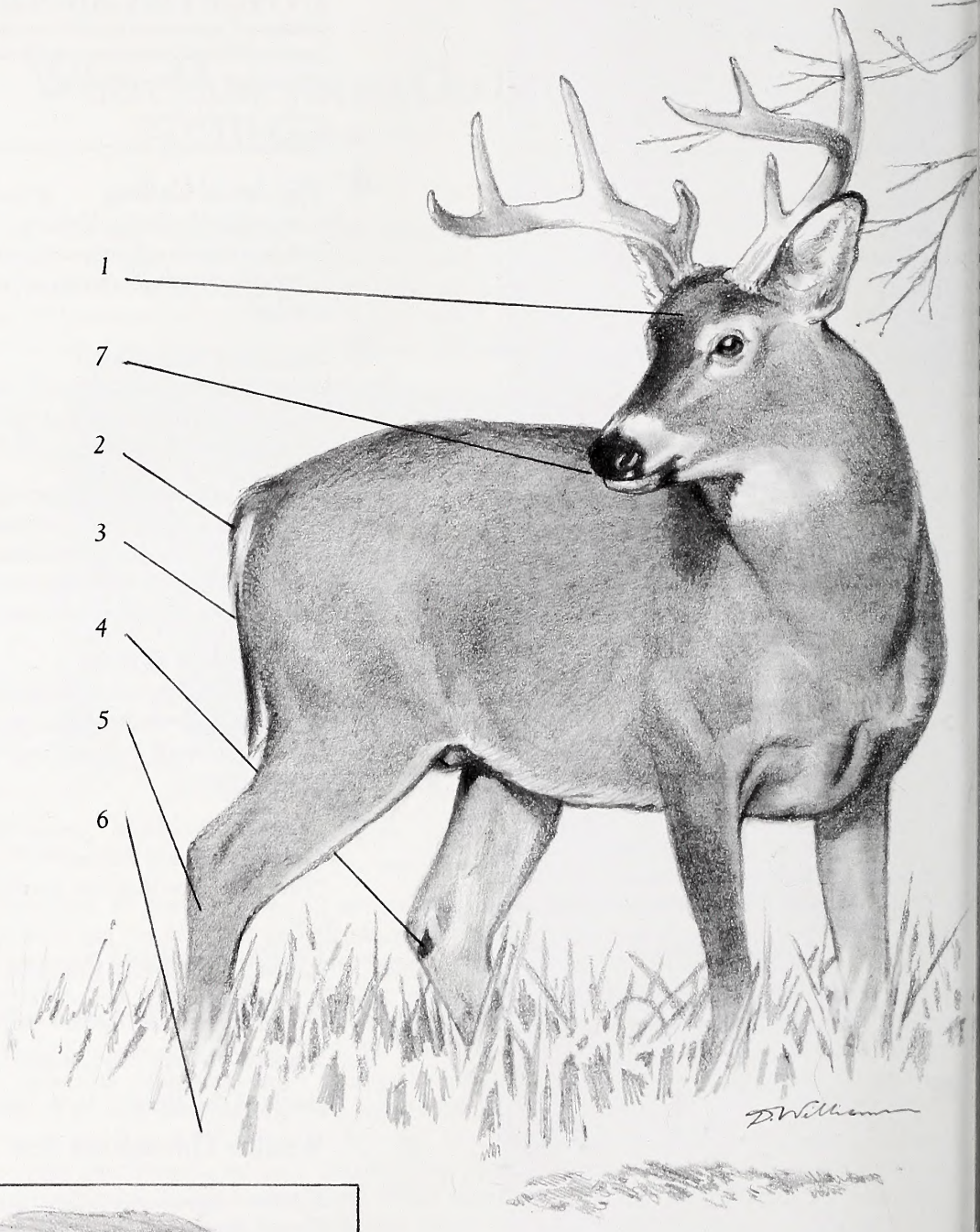
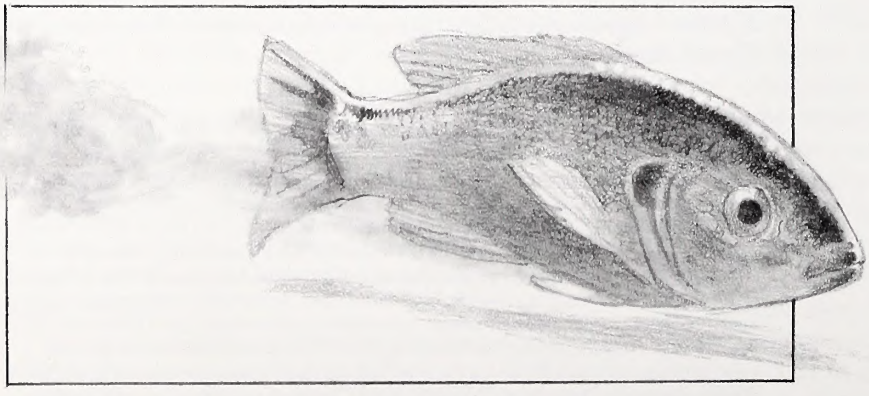
**Cover** *A great egret feeds at the water's edge near dusk. Photographed by Derrick Hamrick.*

*Wildlife in North Carolina* (ISSN 0043-549X) is published monthly by the North Carolina Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188. Telephone 919-733-7133. Second class postage paid at Raleigh, N.C. and other offices. Subscription rates: one year $7.50, three years $20.00. For subscriptions from foreign countries, payment **only** by U.S. Postal money order or cashier's check drawn on a U.S. bank. All orders must be prepaid. Please allow 6 to 8 weeks for new subscriptions or change of address. POSTMASTER: Send address changes to Circulation Manager, Wildlife In North Carolina, 512 N. Salisbury St., Raleigh, N.C. 27604-1188. Address all correspondence regarding subscriptions to Circulation Manager. If you have a problem with your subscription, call 919-733-3877. Articles published in *Wildlife in North Carolina* may represent the personal views of the authors, and should not be construed as reflecting any endorsement by the N.C. Wildlife Resources Commission. *Wildlife in North Carolina* is available on cassette tape as a courtesy of volunteer services of the Department of Cultural Resources, Library for the Blind and Physically Handicapped, Raleigh, N.C., 1-800-662-7726. **The N.C. Wildlife Resources Commission is an equal opportunity agency.**



**The pheromone** *trail left by ants helps attract others from the colony to a source of food. At first, the odor is strong as the ants continue to move over the trail. Eventually, however, the trail disappears as the food source dwindles and fewer ants work the trail.*



**Fish emit** *pheromones into the water where they are smelled by receptors in a specialized nasal cavity.*

# The Invisible Language of Scent

*written by Lawrence S. Earley/illustrated by David Williams*

**Pheromones are odors** *that carry messages between and among members of the same species. Several glands on the white-tailed deer's body discharge scents that carry specific messages, although not all of them are well understood: (1) forehead glands (home range); (2) urine (aggression); (3) tail glands; (4) tarsal glands (sex, age, individual identity); (5) metatarsal glands (fear); (6) interdigital glands (possibly trail marking). A deer can either smell the scent or lick it to receive the message (7).*

**A rabbit uses** *its chin glands to mark a branch with its individual scent. Many animals use these kinds of pheromones to identify themselves.*

Wildlife may not engage in much social chit chat, but a lot of important themes figure in their communication—food, territory, sex, danger and dominance. Life and death often hang on an animal's ability to share this information not so much by spoken languages like ours, but by silent and invisible cues, what biologists call "pheromones."

Pheromones are chemicals in liquid or gas form that trigger specific reactions when smelled or tasted by others of the same species. Not all odors are pheromones. A skunk's obnoxious odor is not considered a pheromone; it's aimed at any species that threatens it, not just other skunks. A deer may detect an odor left by a cottontail, but to the deer it's just a smell. To animals of the same species, however, pheromones carry an amazing amount of information.

Anyone who's ever walked a dog knows this is true. My beagle Toby sometimes stopped and sniffed at a single scent for minutes on end, before secreting his own message in a few drops of urine. The reason it took so long is that he was "reading" not only the age of the dog that left the urine, but also its sex, how soon it would go into heat if it was a female, whether it was ready to copulate or not, and other information. Such scent posts act as community bulletin boards.

Many animals mark their territories with urine to help space out members of the species so they avoid competing with each other for food and other resources. Beavers mark their territory by spraying a mud patty with a chemical known as castoreum. As many as 50 chemical ingredients may be contained in this pheromone.

Deer have several scent-producing glands that leave an astonishing number of messages. Scent from the tarsal gland (located on the inside of the rear legs) communicates sex, age and individual identity. Scents from the metatarsal gland (located on the outside of the rear legs) express alarm and fear. A gland in a deer's forehead marks its home range and another on its feet leaves scent whose function is not well understood.

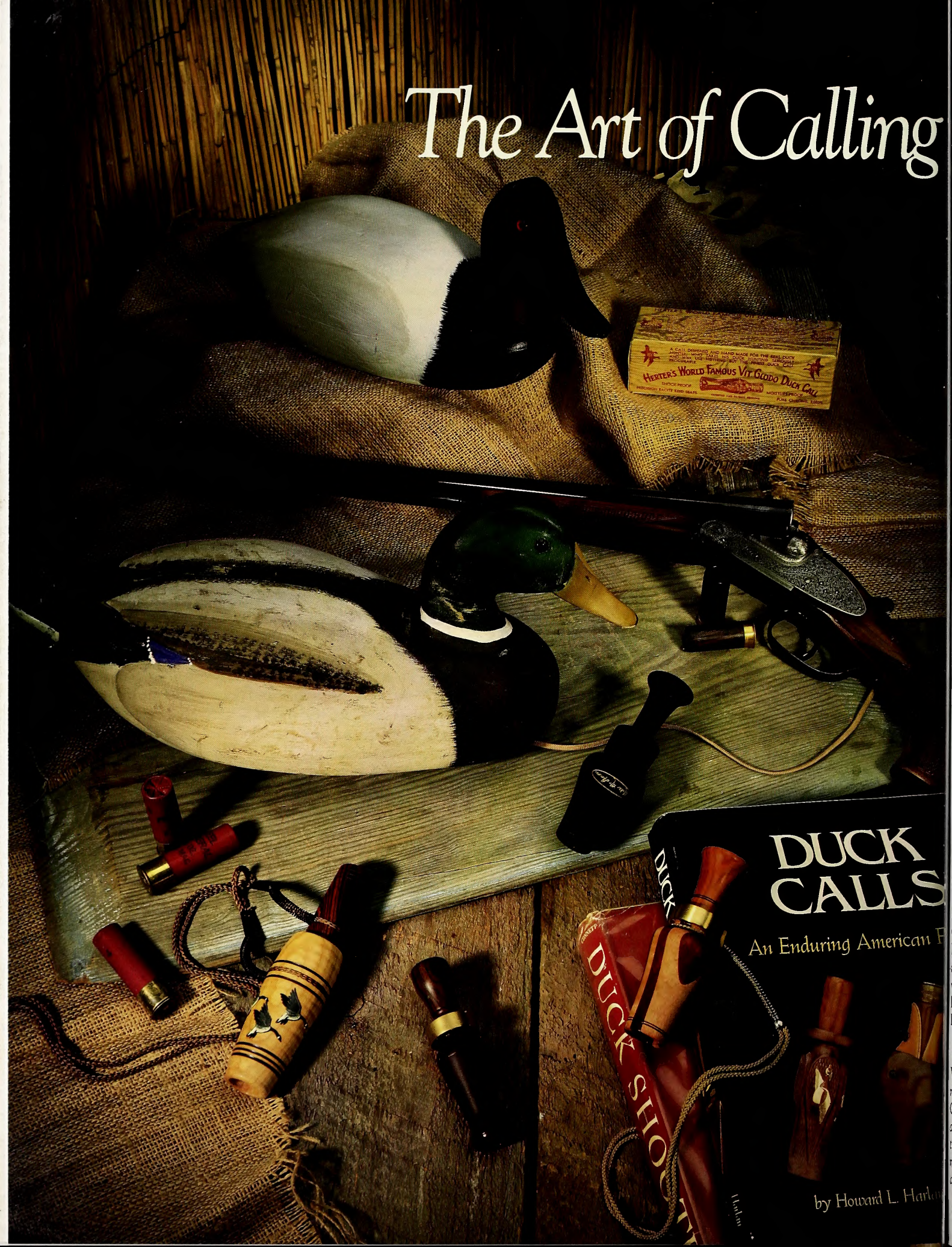
Some social animals use scents to communicate the availability of food. Ants carry scent-producing organs on their abdomens that alert fellow colony members to the existence of food. While bringing food back to the colony, the ant leaves a trail of pheromone that stimulates other ants to follow. When they return with more food, they deposit their own pheromones onto the trail. After the food is exhausted, the scent trail fades and finally disappears.

Some animals can communicate alarm through pheromones. If a minnow is attacked by a predator and its skin is broken, the school flees even though the fish may not have witnessed the attack. A pheromone emitted by the stricken fish instantly activates a fright mechanism among others in the school, driving them away.

The advantage of pheromones is that they tend to persist for a relatively long time and can be detected over fairly long distances, whereas most visual or auditory signals have to be heard or seen close up. The mating pheromones of female moths have been reported to attract males from miles away. Rain can wash odors away, however, and odors don't communicate direction very well.

We humans pride ourselves as the animal that learned to communicate, which is a shaky assumption at best. In many respects, animals do a better job of it . . . and they rarely have to raise their voices.

# The Art of Calling



# Ever hear a guide call geese using only his mouth? It's part of North Carolina's waterfowl heritage, and explains why locally made calls are still rare here.

written by Vic Venters
photographed by Melissa McGaw

Brad Privott holds a duck call to his mouth, leans back like a saxophone player, and begins to blow. A 20-note hail call first, loud and insistent, the pleading comeback next, a few feeding chuckles thrown in, followed by the softer quacks of a lonesome hen, then, seamlessly, he's back loud on a hail call. A moment later he is demonstrating swan and loon calls—using only his mouth this time—then he's clucking to a flock of Canada geese.

Brad's technique is good enough to have won him 12 first-place finishes in international and national waterfowl calling contests—including four first-place finishes in the junior world swan contests—plus a slew of second- and third-place finishes. His calling accomplishments have landed him television spots on "The Late Show with David Letterman," "CBS This Morning," NBC's "Jerry Springer Show," a free trip and television appearance in Thailand and a host of local and state television programs.

Not bad for a 13-year-old.

Brad and his father, Bill, are among the latest experts to join a long list of accomplished waterfowl callers from northeastern North Carolina, once one of the great waterfowling meccas of the nation. It should come as no surprise that Brad and Bill Privott, residents of Currituck County, are experts on duck and goose calls, but inland hunters may be amazed to learn that artificial calls are relatively recent imports into the coastal Carolina waterfowling scene. This is particularly surprising because duck calls have been around since the mid-19th century and were widely used in other old-time duck hunting hotspots, particularly along the Mississippi River and its tributaries.

***While North Carolina** has a rich tradition of mouth calling for Canada geese, the development of artificial calls took place largely in the Mississippi Flyway where the mallard was the most prevalent and sought-after duck.*

Currituck Sound's calling tradition, on the other hand, is based on mouth calling, specifically mouth calling for Canada geese. The story is similar for Core Sound and other coastal North Carolina waterfowling grounds. Despite being one of the nation's most famous and popular destinations for late-19th- and early-20th-century duck hunters, there were no important duck call makers in North Carolina, and imported calls were only occasionally used during this era. North Carolina was not alone in this respect; there are very few records for the use of artificial calls on any of the other traditional East Coast gunning grounds, despite equally rich duck and goose hunting traditions.

So why has the region spawned so few duck and goose calls? Several factors—biological and otherwise—undoubtedly played a role. During the golden age of North American waterfowling, Currituck Sound, Core Sound and other shooting grounds in the East were principally wintering grounds for diving ducks—canvasbacks, scaup and redheads—as well as Canada geese.

Divers—particularly the sought-after (and delicious) canvasbacks and redheads—were hunted from sinkboxes surrounded by vast spreads of decoys. Cans and redheads, especially the less wary birds of that era, responded well to decoys; so well, in fact, to the sinkbox spreads that these deadly submerged blinds were outlawed in the 1920s. With little need to call divers, there was no need to develop duck calls or use them extensively, as long as those species were prevalent.

Geese were another matter: they were the prize of the sounds and, unlike diving ducks, they respond well to calling. In contrast with today's hunting tactics, in which hunters call geese into fields, Currituck hunters of the past shot Canadas exclusively over water, usually with the aid of live decoys. Live decoys were outlawed in 1934, but until then many a coastal waterfowl guide or hunt club kept a flock of captive Canadas.

"Like a lot of other guides, my dad used to keep live decoys—25 to 30 of them," explained Tillman S. Merrell, noted mouth caller and guide who hunted Currituck Sound from the sinkbox days in World War I up to the mid-1970s. He built decoys, boats and worked for clubs such as the Narrows Island Club, Pine Island Club and Currituck Shooting Club. Merrell's wife, Elsie, is the daughter of Ellie Saunders and sister of Blanton Saunders, a father-son duo of famous Currituck waterfowlers.

***At present,** Steve W. Earley of Ahoskie is North Carolina's only commercial custom callmaker. Pictured above is one of Steve's handsome "Downeasterner" Arkansas-style calls.*

"Live geese made a lot of noise," Merrell elaborated. "And you could train them geese just like a dog. My brother had an old gander that he'd stake out upwind of the decoys. If the hunters saw a flock off in the distance all he had to do was shout that gander's name and he'd go to calling."

As long as the real thing was available, there was little need to use calls. "After live decoys was outlawed," Merrell added, "calling became more important. We could hunt almost anywhere in the sound and know we'd kill a few ducks. But geese, you needed to figure out how they would fly and work your rig. And we called them in by mouth."

Artificial goose calls have been dated back to around the turn of the century, but virtually all coastal Carolina callers shunned them for mouth calling. "In my prime days there were no artificial calls on Currituck Sound," Merrell said. "Back then, everyone couldn't call geese, but most people tried, even if it weren't nothing more than like calling a hog or something. Almost any sound would attract a goose to your decoys and if they looked good, here they'd come."

Mouth calling for geese was also practiced in some other locales, notably in Illinois, but the best Currituck callers were widely respected for their abilities to attract geese. A couple of factors made goose calling by

***At age 13,*** *Brad Privott has already won a host of national and international waterfowl calling contests. He joins a long line of distinguished callers from Currituck County, and is adept using artificial calls or his mouth.*

mouth popular and feasible in the region. For one, it is easier to duplicate a goose call by mouth than it is to call, say, a mallard by mouth. Good callers—as Bill Privott demonstrated—can generate tremendous volume by mouth calling, which makes it a practical hunting technique for geese.

"Mouth calling for geese is similar to yodeling," Bill Privott explained. "It starts down deep and you push the sound up your throat until it breaks, giving the characteristic *gu-luck!* Bill Privott showed off his mouth calling skills by winning back-to-back World Goose Calling Championships at Easton, Md., in 1983 and 1984, beating out an auditorium full of championship callers using artificial calls.

Today, with fewer ducks, circumscribed seasons and the shorter ranges necessitated by steel shot, the use of artificial duck calls is firmly entrenched in modern North Carolina waterfowling technique. Artificial waterfowl calls have no doubt been used for a long time by some North Carolina hunters, but they didn't become popular in Currituck and other traditional locales until the early to mid-1970s, especially after goose and canvasback populations began declining and hunter interest shifted to puddle ducks.

To the Mississippi Flyway goes the acknowledged crown in duck call development and use, and callers from that flyway still dominate national and international calling contests. One can speculate on the various reasons why the art of duck calling reached an apogee there, but the answer is really quite simple—the mallard was the most prevalent and sought-after duck in the flyway. The mallard is, after all, a vociferous caller, and it responds well to calls. Mallards and other dabblers along the Mississippi were and are hunted in flooded timber, where the sound of a duck is as important for success as the sight of decoys. It's a far cry from the open marshes and big water of Currituck and Core sounds, where the decoy reigned supreme.

In general, duck calls and their development have been poorly chronicled, with one modern exception. Custom call maker Howard L. Harlan of Tennessee and W. Crew Anderson have written an excellent book, *Duck Calls: An Enduring American Folk Art*, which traces the history of North American duck calls and the important makers who have invented, improved or contributed to the development of the call.

The earliest duck calls in America can be traced to the 1850s and were called "tongue pinchers" because they had no barrel surrounding the two tone boards and reed. A tongue pincher looked like a big Corona cigar that was split down the middle on the rounded end. A reed was placed between the two tone boards, and because of the open design, the call no doubt earned its sobriquet.

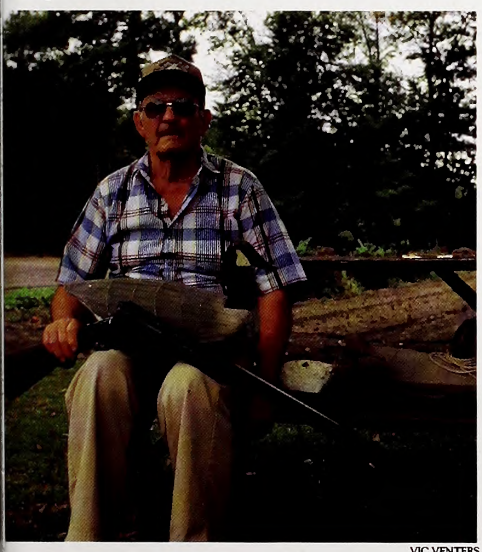
By the mid-1860s a barrel shroud had appeared on duck calls, setting the stage for landmark improvements made in the 1880s by Victor Glodo, a call maker who worked Reelfoot Lake in Tennessee. Glodo modified the innards of the call by straightening the tone board and using a wooden wedge block to anchor the reed. He was also the first to add checkering to the exterior of his gracefully shaped calls, and Glodo "Reelfoot-style" calls are still made today. Since then, duck and goose calls have continued to evolve in

Illinois, Arkansas and Louisiana. The raspy calls from Cajun country, for instance, are characterized by double reeds and barrels made from cane.

North Carolina is a little late getting in the act, but Steve W. Earley of Ahoskie is now making what are probably the state's first commercial custom calls. Earley's hand-crafted "Downeasterner" calls are Arkansas-style calls turned from coca bola wood and each is individually tuned. Earley prefers single-reed calls for quality of sound, but he will also make double reeds. He hopes to complete about 250 calls by year's end.

And what about the future of mouth calling in North Carolina? The migratory goose population wintering in North Carolina is a fraction of its former size, so with the geese went a main impetus for perpetuating the mouth calling tradition. While there will no doubt be a few new callers, such as Brad Privott, taking up mouth calling, the future looks brightest in the direction of artificial calls. Custom calls that are sold or endorsed by a championship caller have broad commercial potential, while mouth calling remains an exclusive and limited financial asset, so to speak. And artificial calls have now been refined and improved to a point that virtually anyone, with practice, can blow them, if not expertly, then adequately.

Like a good retriever, a properly employed duck call is an excellent conservation tool, particularly when hunters have to shoot steel shot. For all but the best shots, waterfowlers today must attract ducks to close range to kill consistently and cleanly without undue crippling, and duck calls can unquestionably help the hunter do that.



VIC VENTERS

***Tillman S. Merrell** hunted and guided on Currituck Sound from World War I until the 1970s, and was a noted mouth caller in his day. Here he poses with a few of his own hand-crafted decoys dating from the 1940s.*

***Historically,** a large spread of decoys on open water was more effective than calling in coastal waterfowling locales such as Currituck Sound. With the decline of North Carolina's migratory goose and canvasback populations, the use of calls for hunting dabbling ducks has grown in importance.*

There are now many excellent audio- and videotapes that will teach the interested hunter how to blow a call. Practice is the key to obtaining a correct sound. Tapes or books offer good advice, but always remember that when to call can be virtually as important as how to call. Experience is the best teacher. "You have to blow as much as necessary but no more than you need to bring birds in," Bill Privott explained. "A lot depends on how much hunting pressure you've got where you are. Ducks definitely get call shy, particularly late in the season."

Instructional tapes are excellent teaching tools, say experts, but don't be a literalist at interpretation. "You can buy tapes that tell you to say this exact word or that particular sound into a call as you are blowing," Bill Privott elaborated. "But, remember, everyone's voice is different. If I repeat what someone is telling me to say, it will sound different than if they said it. And it will sound different coming out of a call. You've got to listen to what these people are telling you and convert it to how your voice works."

Choose your calls carefully. "I believe that the *only* way to buy a duck or goose call is to try out a lot of different calls and find the one that sounds best the way you blow it," Bill Privott added. "You can go to a show or a contest and a call maker may have 50 calls out that are the identical model. But each one will blow differently, if only slightly. However, that slight difference can be very important. You've got to blow them all and find the one that best matches your air."

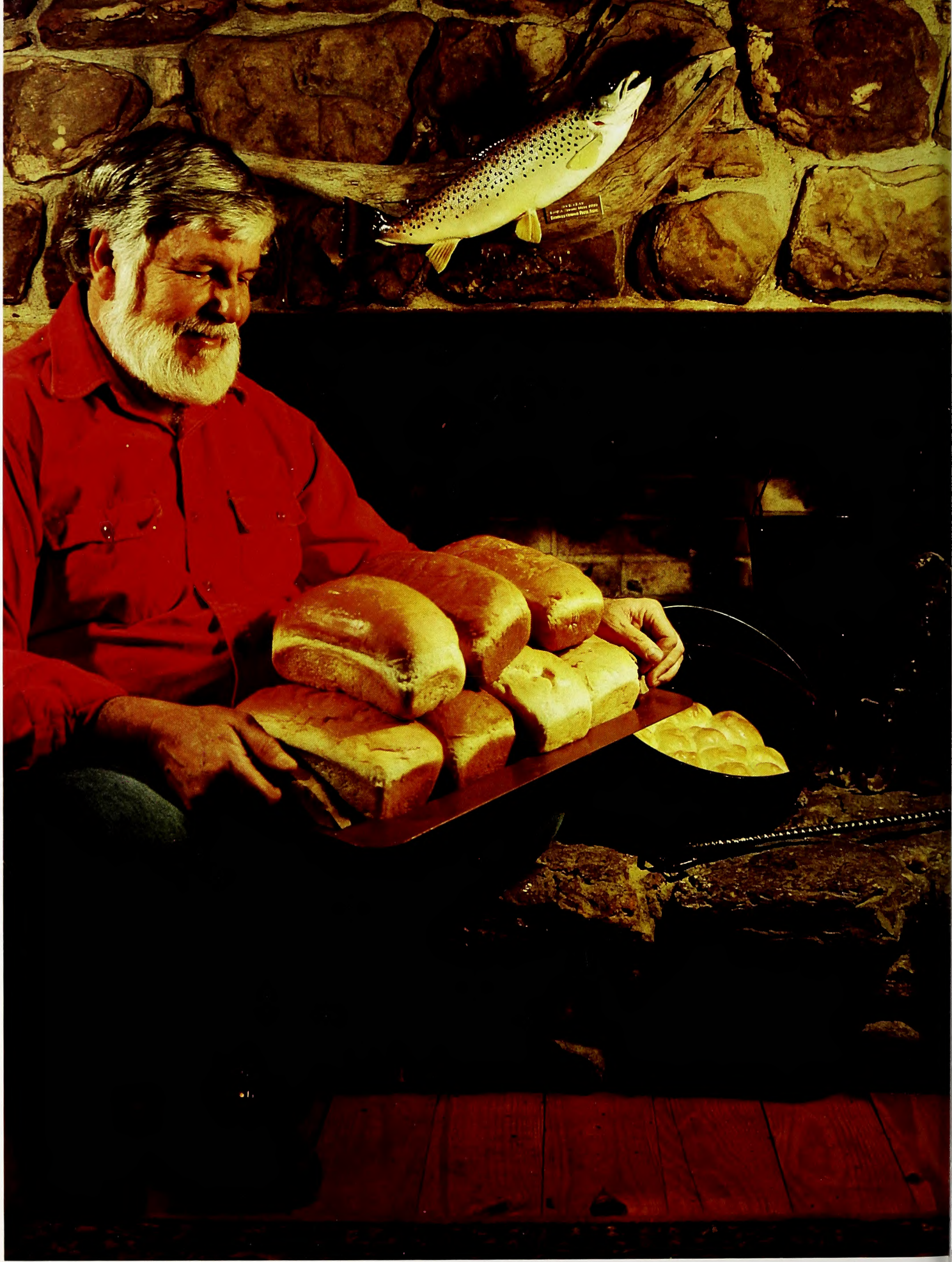
Most competition callers, and many hunters, prefer single-reed calls to double-reed calls. "Single-reed calls are harder to learn to blow correctly, but once you do learn they give a better sound," says Steve Earley. "The higher pitch that you get from a single reed will carry farther, too." On the other hand, a good double-reed call can be easier to blow and the raspy, softer sounds produced by it are often effective on call-shy birds. In the end, buy what's best for you and work toward learning to blow a single reed if that's your desire.

Of course, mastering any type of duck or goose call adds a whole new dimension to waterfowl hunting. It can transform you from a passive shooter to an active hunter, with your skill determining not only success, but how you measure success.

"I really miss calling geese," Merrell reminisced at his home on Currituck Sound. "Calling and working and pulling in a big flock and having them set their wings over my decoys was a picture in the world to me. I really enjoyed that, more so than shooting them."

That's the art of calling defined. ⊡

*Thanks to Howard L. Harlan, T. S. Merrell, Bill and Brad Privott and Steve W. Earley for sharing information that made this article possible.*



# SOUTHERN SOURDOUGH

## Outdoorsmen, camp cooks and native Southerners know that this wonderful bread didn't originate in Alaska. Try a batch during the holidays.

written and photographed by Soc Clay © 1994

Folks often ask me how I became so interested in sourdough baking. Heck, we southern folks prefer a pan of cornbread or steaming hot biscuits straight from the oven to a loaf of fresh-baked bread, right?

Well, maybe. Then maybe not. Sourdough, as you have probably heard if you've stopped for a bite at a Cracker Barrel lately, is enjoying a renaissance of popularity throughout America. This all-natural foodstuff is becoming the rave in specialty bakeries and stores that offer health foods—even in Dixie.

Actually my fascination with sourdough began more than 50 years ago, when the late W. W. Walker, my father's farm partner and a bona fide miner in Alaska during the great Gold Rush of 1897, moved into our home. Jack London's famous *Tales of the North* couldn't hold a candle to some of W. W.'s hair-raising stories that came straight out of the Klondike.

Between strikes, W. W. also served several sessions as a cook in the big timber camps in Washington. But whether he was panning for gold dust on the Yukon or serving up gargantuan portions of food to starving lumberjacks, a keg of sourdough starter was always close at hand.

Somehow, sourdough edged out cornbread and baking powder biscuits as the standard breadstuff of the gold rush era. Perhaps it was due to a shortage of fresh-ground cornmeal, or maybe it was too difficult to obtain baking powder in those remote places. Whatever the reason, sourdough starters and the breads and baked goods they produced were so glamorized by the turn of the century that they gave an entire generation of rugged individuals its name. The hunters, trappers, miners and homesteaders who were called "sourdoughs" owed their survival in some of the most difficult areas of the world to hard work, and, as W. W. pointed out many times, to sourdough.

Sourdough results when a "starter" is added to a flour-and-water medium that constitutes the basic ingredient in leavened bread. The "sour" part stems from the taste and smell that originate in the starter, which is little more than a liquid dough in a constant state of fermentation. Some might even call it flour wine or beer. W. W. said it was often used for a nightcap when other beverages were in short supply in remote backcountry camps.

"Talk about a humdinger of a headache," he moaned, apparently recalling some earlier experience with the potent liquor.

Sourdough starters have been used widely for thousands of years. Food historians believe that the first leavened breads created from a sourdough starter came from Egypt about 4000 B.C. It was the Greeks, however, who first understood what caused breads to rise. No doubt the very first starters came from a baker who may have also been an expert in wine making and understood the fermentation process. In North America, sourdough starters were the only leavening agent available for making loaf breads until the latter part of the 19th century, when processed yeast became readily available.

But even though commercial yeast soon replaced sourdough throughout most of the country, starters survived in the remote regions of North America and along the California coast, where sourdough bakery products have for many years enjoyed international acclaim.

Today, more and more kitchens are smelling a wee bit sour as sourdough starters bubble and brew on the shelves behind the stove. Bakers are not only learning that sourdough products are good for you, they are also listening to the advice of some of the world's greatest food experts, who proclaim that sourdough remains one of the finest leavening agents for superior bread making.

Sam Roberson, a Tennessee cook who survived 35 years in the Alaskan bush and is the nearest thing to a true sourdough that I know of, is fond of telling folks about his starter that has been bubbling in one form or another for nearly 100 years.

Sam explains to folks that a sourdough starter is a whole lot like a bucket of bugs. It's a living, breathing colony of yeast organisms, shaped like teensy footballs equipped with swim fins. These little bugs survive on starch, converting it to sugar, and pee alcohol.

Sex for the sourdough bug, he notes, is somewhat of an uninspiring experience. It eats, grows and, when large enough, divides in the middle. Both ends continue to eat, grow and separate time and again as long as the habitat is favorable.

Since millions of wild yeast cells float around in the air, it is quite possible to catch a culture by simply leaving an open container of growth medium (flour and water) sitting outside on the steps. That's probably how the early Egyptian bread bakers along the Nile River first discovered leavened bread. But catching a wild yeast bug that makes a truly great starter has been compared to going to the local dog pound to find a world-class pointer. It's possible, of course, but the chances are pretty slim.

Some modern sourdoughs are convinced that only those starters made with prime hops, freshly ground flour and mountain spring water that are mixed together, fed, used and aged for at least 20 years are worth bragging about. Others argue that a potato-water mixture is best, while some say the truly great starters are made with fresh, raw milk, straight from the udder.

About the only thing sourdough bakers do agree on is that a starter does its best work at a temperature of about 83 degrees Fahrenheit. When chilled below 50 degrees F. it pretty much goes to sleep. That's why it can be stored in the refrigerator for long periods without being fed. Bakers have also learned that extreme temperatures will cause the sourdough bugs to literally pop and poop

***Sourdough has been** around perhaps 4,000 years, no doubt surviving because it produces delicious baked goods. Learning a few simple tips will help the neophyte sourdough cook.*

out. Very hot tap water used to mix bread dough may be the chief reason that some sourdough starters don't seem to start very well. Personally, I don't like to use liquids that are hotter than 100 degrees F. for any kind of bread making.

The earliest sourdoughs stored their starters in small wooden kegs with the bungs loosened. Gary Winegar, a noted outdoor scribe from Virginia, swears he's seen sourdough starters strong enough to win an arm-wrestling match with Hulk Hogan, and some have even gotten up off the shelf where they were created, walked around the room and held private conversations with him!

Perhaps that's what caused the groan on W. W.'s lips when he was first telling me about using sourdough for a nightcap those many long years ago.

To prevent this or other horror stories, I keep my starter in an old steam table crock—the kind they used in restaurants years ago to keep food hot. Others I know simply store the creature in a plastic container with a loose-fitting lid. The latter, of course, is terribly important, as any home-brew expert can attest.

I do caution folks who attend my seminars on sourdough baking NOT to store sourdough starter in glass jars with self-sealer lids. Talk about an explosion with shrapnel flying everywhere! And please don't put it in a metal container. Did you ever see alcoholic beverages stored in metal?

Newcomers to the world of sourdough starters will discover that it's best to use a plastic or wooden container or a crock that holds at least eight cups of liquid and is shaped so that it fits into the refrigerator handily. They will also learn that if the starter is used at least three times a week and refreshed each time with starter food, no refrigeration is needed to suppress the growth of the yeast bugs. But refrigerated or not, a loose-fitting lid keeps the pressure under control.

Most modern cookbooks that deal seriously with bread making have one or two starter recipes. The one I like best is the one that's been churning away in my house for a few decades. Like my friend Sam, I also have a starter kicking away on top of my hot water heater that was around when W. W. was slinging a pick in the gold camps. If I had to create a brand new one, here's how I would do it:

In an appropriate container, soften one package of dry yeast in a half cup of warm water (at about 83 degrees F.) and let stand for about five minutes. Stir in one 12-ounce can of warm beer (the nonalcoholic kind works fine), two cups of all-purpose flour, three tablespoons of sugar and one teaspoon of salt. Mix thoroughly and set the container, covered with a clean cheesecloth, in a warm place (like on top of the hot water heater or in the oven with the light turned on) for about three days. At the end of this period, the starter should be slightly aged and is ready to substitute in any recipe that calls for yeast.

As mentioned earlier, if the starter is used two or three times a week and is replenished each time with two tablespoons of sugar, one cup of all-purpose flour, ½ cup milk and ½ cup warm water for each cup of starter removed, it will last forever.

Realistically, though, I've found that storing the starter in the refrigerator between use is by far the best way to keep it going. Under normal circumstances, the starter in the fridge can be kept for 10 days without adding or subtracting anything. From then on, a teaspoon of sugar is enough to carry it another 10 days and so on.

Folks ask me about the clear liquid that collects on the starter after a while. I think that's the stuff the old sourdoughs drank! Seriously, it's the potent alcoholic part of your starter and should be stirred back into the mixture. You'll know when your starter goes bad. It turns black!

To make sure your original starter lasts for years, remove a half pint (8 ounces) from the original batch, pour it into a sturdy container, mark the date of the original on the outside and freeze. If your working starter should fail sometime in the future—and it probably will—all that's needed to continue the original is to thaw the 8 ounces of insurance, add two cups of flour, an equal amount of warm water or beer and a tablespoon of sugar. Allow this to work overnight in a warm place and

***Sourdough bread** was long a favorite of frontier cooking, perhaps because of a shortage of other baking aids at inaccessible locations. Sourdough can be cooked by a variety of ways, but trail cooks have long favored the traditional Dutch oven.*

the original is again ready for use. Remember to take out another 8 ounces and freeze against a future mishap.

I obtained my oldest starter in the form of a dried flour cake, which is yet another method of preserving some of the original starter. To make the cake, simply pour a puddle of working starter into some flour and work it to the consistency of a potato pancake. Allow the cake to dry (it requires a week or more), wrap in foil or plastic and store in a cool, dry place or freeze.

When a new starter is needed, break the cake into small pieces, add flour, warm water and sugar and set in a warm place until fermentation is well under way again.

Along with a basic recipe for reconstruction of the original starter, these cakes make an excellent gift when fancy packaged, especially during the end-of-the-year holiday season.

Time plays an essential role in sourdough baking. Natural leavening requires more time than packaged yeast to activate bacteria in a flour-and-water medium. Pancakes and loaf breads are especially time consuming. That means if true sourdough bread is wanted, there has to be enough time to allow for the slow activation of the yeast properties in the starter. Depending on the kind of bread being made, the time required for it to rise to double its size (the traditional measurement for determining when leavened bread is ready for the oven) may vary from as little as two hours to as much as 12. That's the reason that most sourdough bakers start the process the night before by creating a sourdough " batter" or "sponge." A basic sourdough batter I use for delicious breads, muffins, biscuits and pancakes begins the evening before, when I mix two cups of warm water per cup of starter in a glass or plastic mixing bowl or crock. Add two and one-half cups of all-purpose flour and mix loosely. Don't worry about small lumps; the fermentation process will smooth it all out before morning. Cover loosely and set in a warm place overnight or for 12 hours. By using this highly fermented batter as a base, the actual rise time of the finished dough I reduce to about that of conventional yeast recipes.

There are, of course, multitudes of uses for sourdough, depending on the ingenuity of the baker or cook. An old camp cook told me that he used starters thinned a little with buttermilk as a breading for fish and onion rings and to coat French-fried potatoes.

Today, with many traditional values in food preparation resurfacing, the sourdough starter is once again finding its place on the kitchen shelf. To some, sourdough is a link to the past, when times were less hectic and high-quality baked goods from the kitchen were truly as American as apple pie. To others, it's simply delicious! ☒

# Savory Sourdough Recipes

### *Down South Blueberry Muffins*

1 cup basic sourdough batter
½ cup vegetable oil
1 egg
½ cup sugar
½ cup whole wheat flour
1½ cups all-purpose flour
1 cup drained blueberries (raisins may also be used)
¾ teaspoon baking soda
½ teaspoon nutmeg
¼ teaspoon cinnamon

Blend soda, sugar and spices together separately. Mix all other ingredients with 1 cup of sourdough batter. Add soda, sugar and spice mixture. Mix batter until just moistened. Fill greased muffin tins ¾ full and bake at 350 degrees for 20 minutes. Test muffins with toothpick before removing from oven. If still moist, add two to five minutes additional baking time.

### *Sourdough Biscuits*

2 cups all-purpose flour
1 tablespoon sugar
¾ teaspoon salt
2 cups sourdough batter
2 tablespoons margarine or shortening

Eight hours before baking, mix 2 cups starter with 2 cups all-purpose flour in a glass, stoneware or plastic mixing bowl. Cover loosely and set in a warm place.

Before baking, add sugar, salt and margarine. Form into a sticky dough. With floured hands, pinch off walnut-size biscuits and place in greased baking pan or Dutch oven, making sure biscuits touch. Set in warm place and allow to rise for 15 minutes. Bake in oven preheated to 400 degrees for 25 to 30 minutes or until biscuits are light brown. Remove and brush with melted butter or margarine. Serves four.

### *Fern Hollow Sourdough Pancakes*

Prepare 1 quart of basic sourdough batter. Add:

1 egg
2 tablespoons cooking oil
½ cup instant dry milk
1 teaspoon salt
1 teaspoon baking soda
2 tablespoons sugar

Mix egg, oil and instant dry milk into basic starter. Blend salt, soda and sugar and sprinkle over the batter. This will leaven, causing a foaming action. Let rest five minutes. Then, using a tablespoon, drop dollar-size pancakes onto a hot griddle or skillet surface sprayed with PAM or other shortening. If batter is too thick to drop off spoon, add a small amount of liquid milk to thin. Remember, sourdough pancakes require a hotter surface than traditional pancake recipes to brown properly. Serve with warm maple syrup or fresh fruit. This recipe serves three.

### *Easy Waffles*

Use sourdough pancake recipe. Add ½ cup yellow cornmeal when mixing batter to make a nuttier, crisper waffle. Spray waffle iron with shortening to prevent sticking, even with Teflon grids.

### *W. W.'s Golden Honey Bread*

Make 1 quart of basic batter. Allow to sit overnight in warm place.

1 quart sourdough batter
2 cups milk
2 tablespoons butter or margarine
2 tablespoons salt
2 tablespoons sugar
¼ cup honey
¼ cup wheat germ
2 cups wheat flour
4 cups all-purpose flour
2 teaspoons baking soda

In a large mixing bowl, scald 2 cups milk. Add butter and honey and allow to cool. Add to 1 quart sourdough batter. Stir in wheat flour and wheat germ. Blend sugar, salt and soda until smooth and sprinkle over top of dough, stirring in gently. Cover dough and set dough in warm spot for 30 minutes. Break down and add remaining flour until dough is too stiff to stir. Turn out on a floured surface and knead for 8 to 10 minutes or until dough feels light and satiny to the touch.

Separate in two equal portions, flour lightly, fold over, seal seams and place in greased 9" x 5" x 2½" baking pans. Grease top of dough with oil or margarine; set in warm spot until double in bulk (about 1 to 1½ hours). Preheat oven to 400 degrees and bake bread for 20 minutes, then reduce to 325 degrees and continue baking another 20 minutes or until bread shrinks from the side of the pan. Remove bread from oven and turn out on rack or towel and butter tops. Makes two loaves.

# *Symphony in Silhouette*

The natural world is like an orchestra;
its best performances may be as memorable as they are unpredictable. Outdoors, one learns to anticipate the same exquisite yet fortuitous grace in the slanting light of early morning or late afternoon. Photographer Derrick Hamrick conducts.

photographed by Derrick Hamrick © 1994

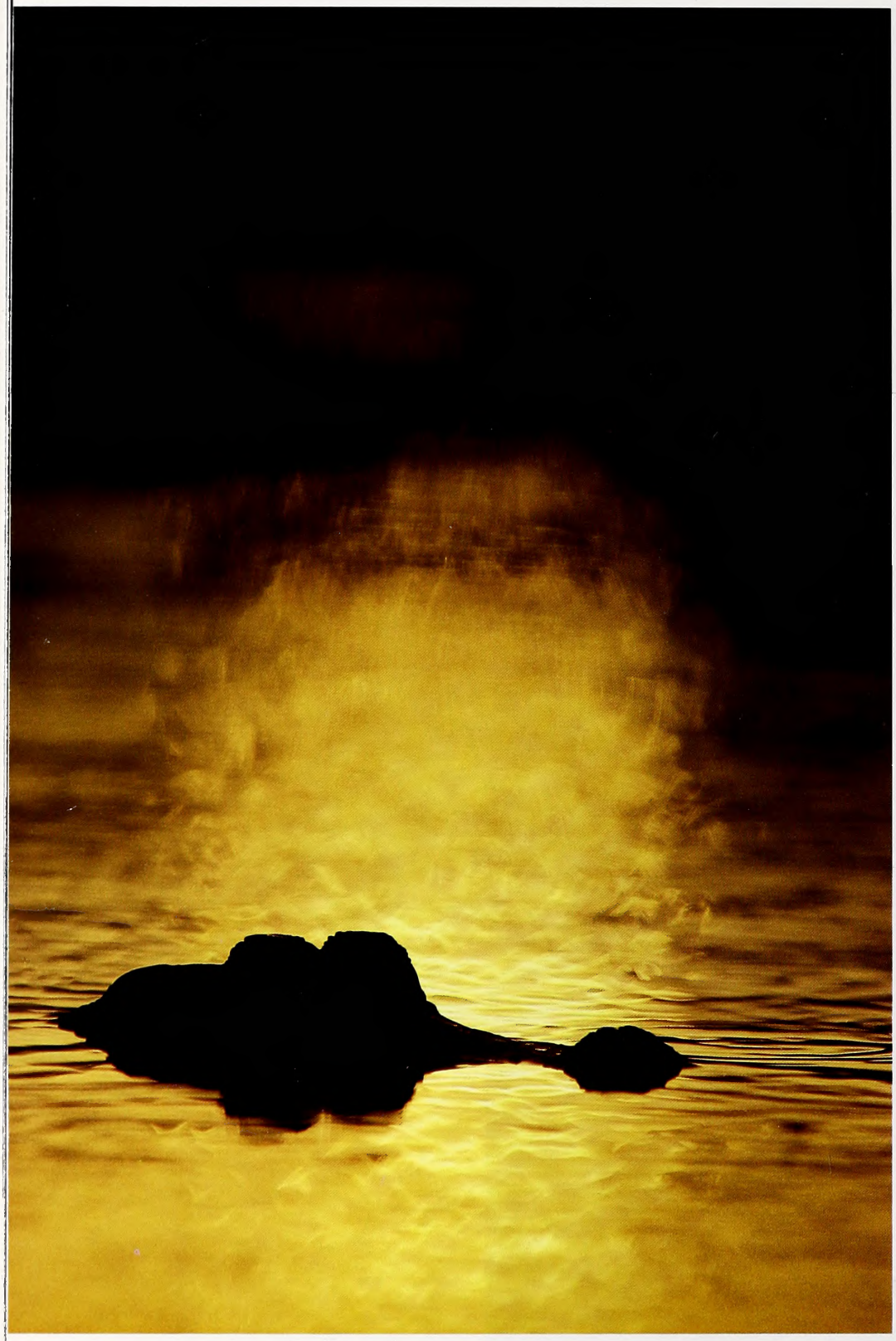
*This male Fowler's toad sings for a mate at dusk.*

*A red-tailed hawk soars to a resting spot at twilight.*

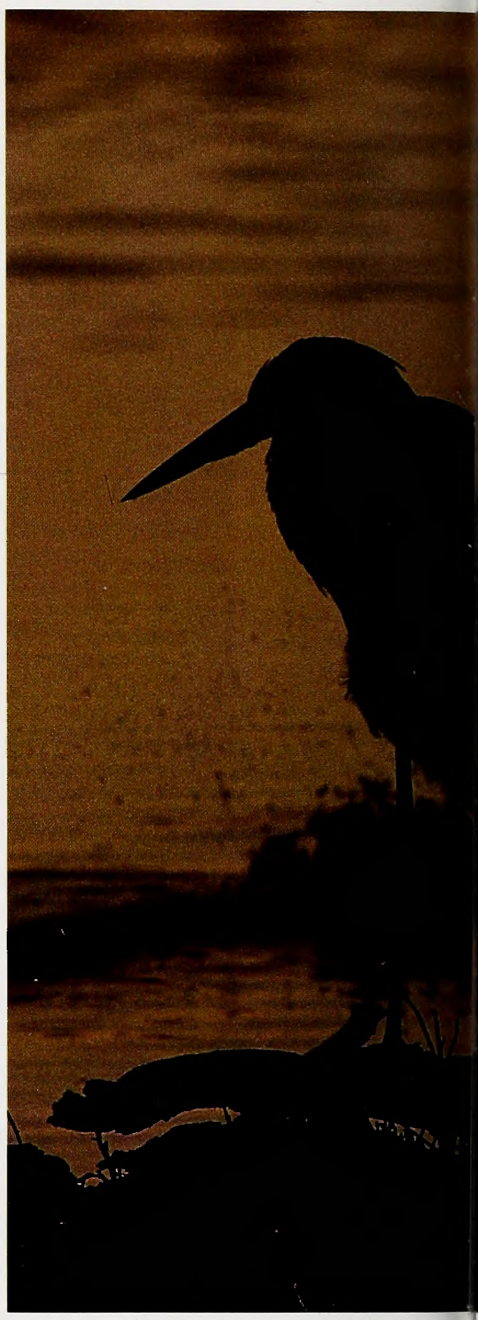
*Two coots glide on the golden water at sunrise.*

*The first rays of the morning sun silhouette a butterfly.*

A ring-billed gull stretches lazily at first light.



*An alligator rests in what looks like a pool of brass at dawn.*



*A great blue heron and a green-backed heron search for breakfast as a cormorant decides to look for a meal elsewhere.*

*Derrick Hamrick is a free-lance natural history photographer from Raleigh whose outstanding work has previously been published in* Wildlife in North Carolina. *His magazine credits include* National Wildlife, National Geographic World, BBC Wildlife, Birder's World, Nature Photography *and numerous books, calendars and brochures. Hamrick also conducts photography workshops and gives slide presentations. His specialty is endangered species.*

# The Rock in Winter

A big rockfish on the line will warm you up in a hurry. Here are several techniques that will work for these stripers on North Carolina's lakes this winter.

written and photographed by
Gerald Almy ©1994

The date was December 13. Normally, I would have been doing other, more winterlike, things—quail hunting, deer hunting, Christmas shopping, watching the National Football League. But my friend Mickey Johnson had just moved to the North Carolina shores of Lake Gaston, and he had invited me on a trip that would change my winters forever. He'd told me there were stripers to be caught.

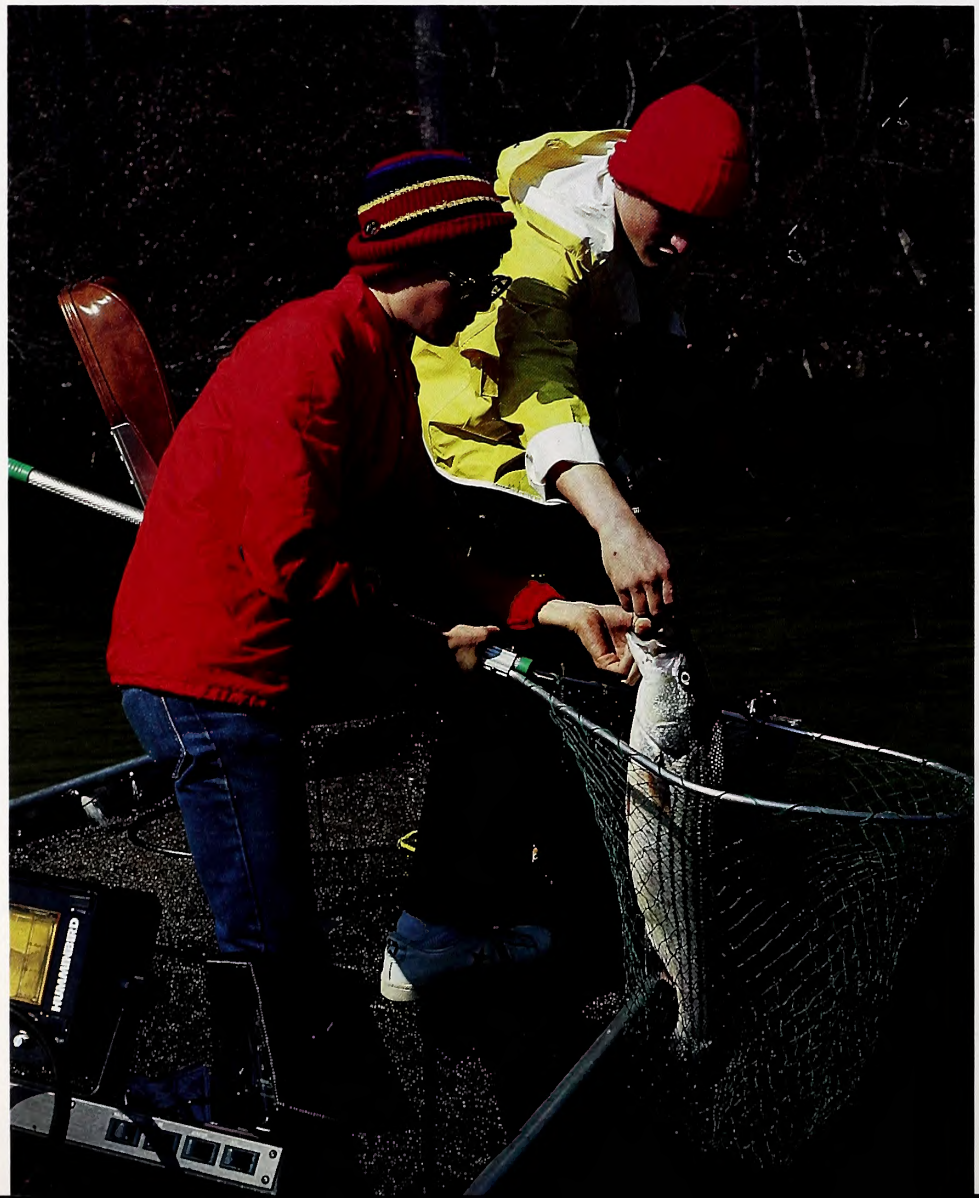
We sliced across the lake's mist-shrouded surface and slowed to a crawl as we approached the bridge on Pea Hill Creek, just off the main lake. With the motor idling in neutral, we watched to see which way the current was flowing. It was pumping from the dam into Roanoke Rapids Lake, so we anchored on the down-current side of the bridge pilings. Our rigs were simple—spinning gear, 10- to 14-pound line and 1/0 hooks with a couple of split shot crimped a foot up the line. We baited up with jumbo shiners dipped gingerly out of a plastic foam cooler, then cast them into the steam rising off the lake where the current boiled through the creek.

The bridge itself is an attraction to stripers (or rockfish), and the oxygen-rich flowing water adds another element of appeal, bringing in shad, the favorite food of these line-sided, true bass. It would be hard to find a better setup. And, as I was soon to learn, the cold weather didn't hurt. Indeed, it actually helped our chances.

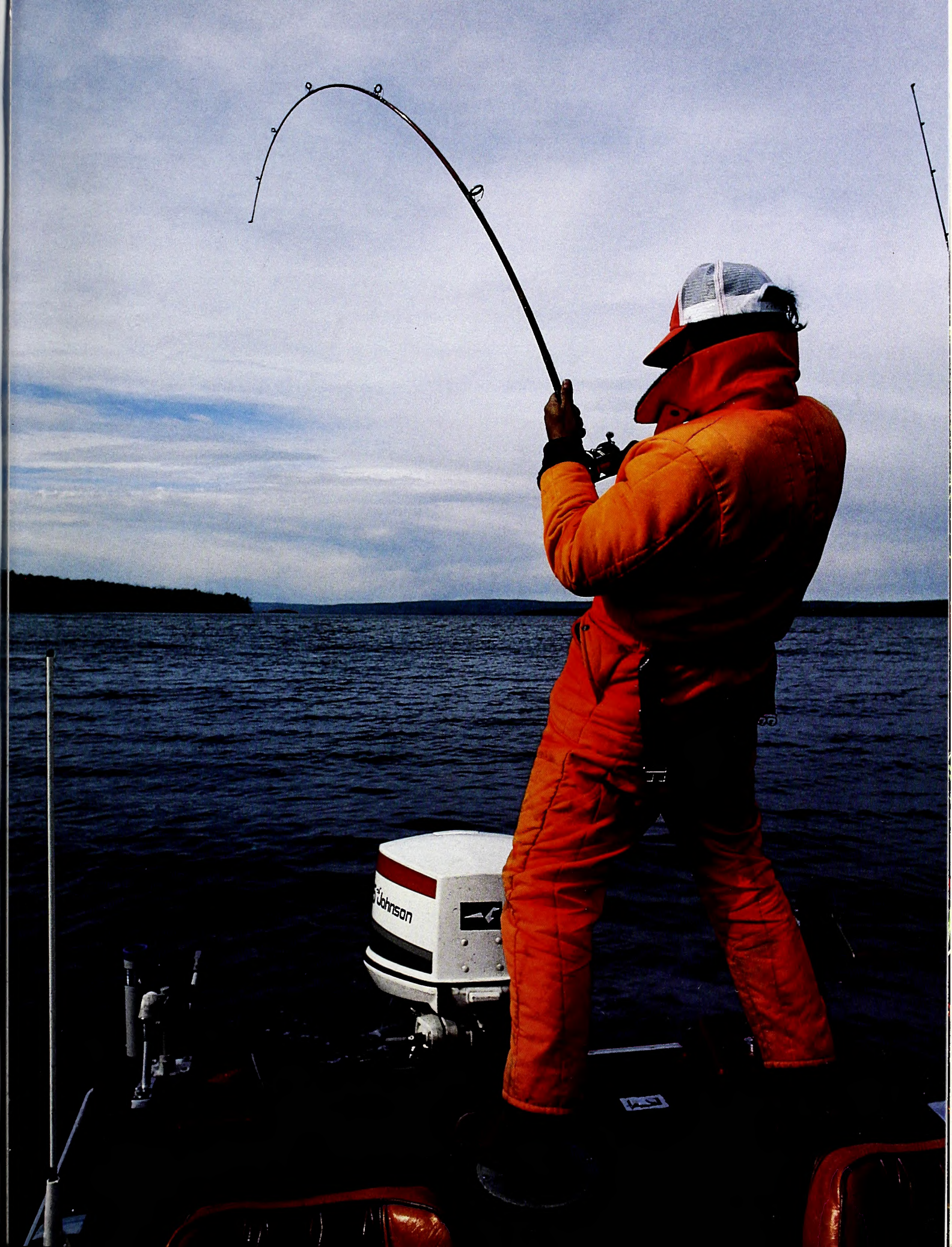
Mickey's rod dipped first, and soon he was struggling to keep up with the antics of a 10-pound striper. Finally, I slipped the net under its silvery white belly and hoisted it aboard....

My turn came next as I was working my shiner gently like a plastic worm. Mickey had told me I didn't have to move it and could just let it hover in the flow, but I'm a restless sort when it come to fishing and I knew I'd enjoy the sport more if I retrieved the bait ever so slightly. It proved as productive as Johnson's do-nothing technique. My rod bowed deep in mid-retrieve as a heavy fish ran off half the spool before I could turn it. Ten minutes later I pumped the 18-pound striper to the boat and heaved it aboard.

Before the morning was out, three more stripers came our way—11, 13 and 9 pounders. We also caught several big white perch and a 6-pound largemouth. The next week another friend and I returned and fished the bridge hotspot again, catching over a dozen stripers and several largemouths. Some were caught on minnows, and some on white bucktail jigs. We fished most of the day and continued until midnight under a bright, full moon. I don't know whether the highlight of that trip was catching all of those muscular fish or hearing and watching them jump and slash



***A hefty striper** hooked on a lure trolled on a downrigger tests this angler's tackle (right). The weather can be cold and unpredictable, but these two fishermen are admiring one of winter fishing's rewards (left).*


Johnson

in the white glow of the moon as they chased the hapless shad. Certainly, Christmas shopping and watching football were the farthest things from my mind.

Those trips took place over 20 years ago, and Mickey has been dead a decade, but my passion for cold weather striper fishing is still strong. Over the years, there have been striper trips to South Carolina, Virginia, Tennessee, Oklahoma, Texas and Arkansas. But some of the best winter fishing in the East can still be found in North Carolina's lakes. With the oldest striper hatchery in the world, North Carolina began stocking lakes and impoundments in the 1950s. Roanoke Rapids, Gaston and Kerr—the three adjoining lakes on the Roanoke River system—all have abundant populations of stripers, and Kerr is one of the few lakes in the country where the fish spawn naturally in fresh water, forging up the Roanoke and Dan rivers each spring on successful runs. Among the other Tar Heel lakes that have stripers are High Rock, Hickory, Hyco, Badin and Norman.

The simple system Mickey Johnson showed me has worked well on a variety of striper waters, but I've also fished with several guides and local experts, and I have experimented a good bit on my own. I have discovered that a number of different tactics will produce fish. Learn three or four of these and you'll be well equipped to deal with winter stripers anywhere in the East. You'll also find that winter is a particularly intriguing time of year to catch them. Summer's bounty of fish is often running bare in the freezer, so a few fresh fillets are usually welcome. Besides, fishing pressure is light, offering that rich bonus of solitude that is in short supply on most lakes during the warm months.

Some winter days in North Carolina can be downright balmy, or at least tolerable. Whenever possible, pick those. It usually helps the fishing, or at least doesn't hurt it, and it definitely makes for a more enjoyable day on the water. But you can't count on good weather, so be prepared for the bitter cold by wearing several layers of clothing. I start with synthetic underwear such as polypropylene or Thermax, add cotton pants and shirt, then put on thick wool or synthetic outerwear. A Gore-Tex or similar rain parka and pants as an outer shell will protect against sleet, snow, rain or spray from waves. Always wear a hat that covers your ears and have thin cotton or neoprene gloves available if you need them. You can cut holes for your thumb and the tip of your index finger for better line control. I also bring hot coffee, tea or soup and a hearty lunch to keep my energy level high, or I plan to break for lunch at a nearby restaurant to escape the cold for a while.

Before heading out, it's a good idea to check with tackle shops, bait sellers, a wildlife officer or marinas to find out where stripers have been caught recently. These are fast-moving, big-water fish, and they can cover a lot of lake. It can help considerably to know in advance the general area where fish have been found.

In some lakes, the fish tend to hang out in deep water near the dam during winter. In others, they move far upstream into the headwaters in shallow coves or concentrate in a particular creek or arm of the lake. Knowing

***The author's** favorite lures for winter stripers include a variety of big-lipped, deep-diving lures, and he sometimes rigs a jig to trail a diving plug. The use of a downrigger permits trolling at greater depths, but casting also works at times when fish can be found nearer the surface.*

these tendencies can save lots of time.

Invest in a topo map if one is available. Use a pencil to mark recommended areas. If they produce fish, you can make permanent notes in ink. The topo will show you depths, bottom contours and structure where the stripers are likely to be found. Roads, boat landings and other facilities are also shown. Study the topo before you venture out and look for these potential winter striper holding areas: bridges across large creek arms near the main lake, points, islands, river channel edges, the backs of large feeder creeks, mud flats and power plant discharge areas where warm water is pumped in.

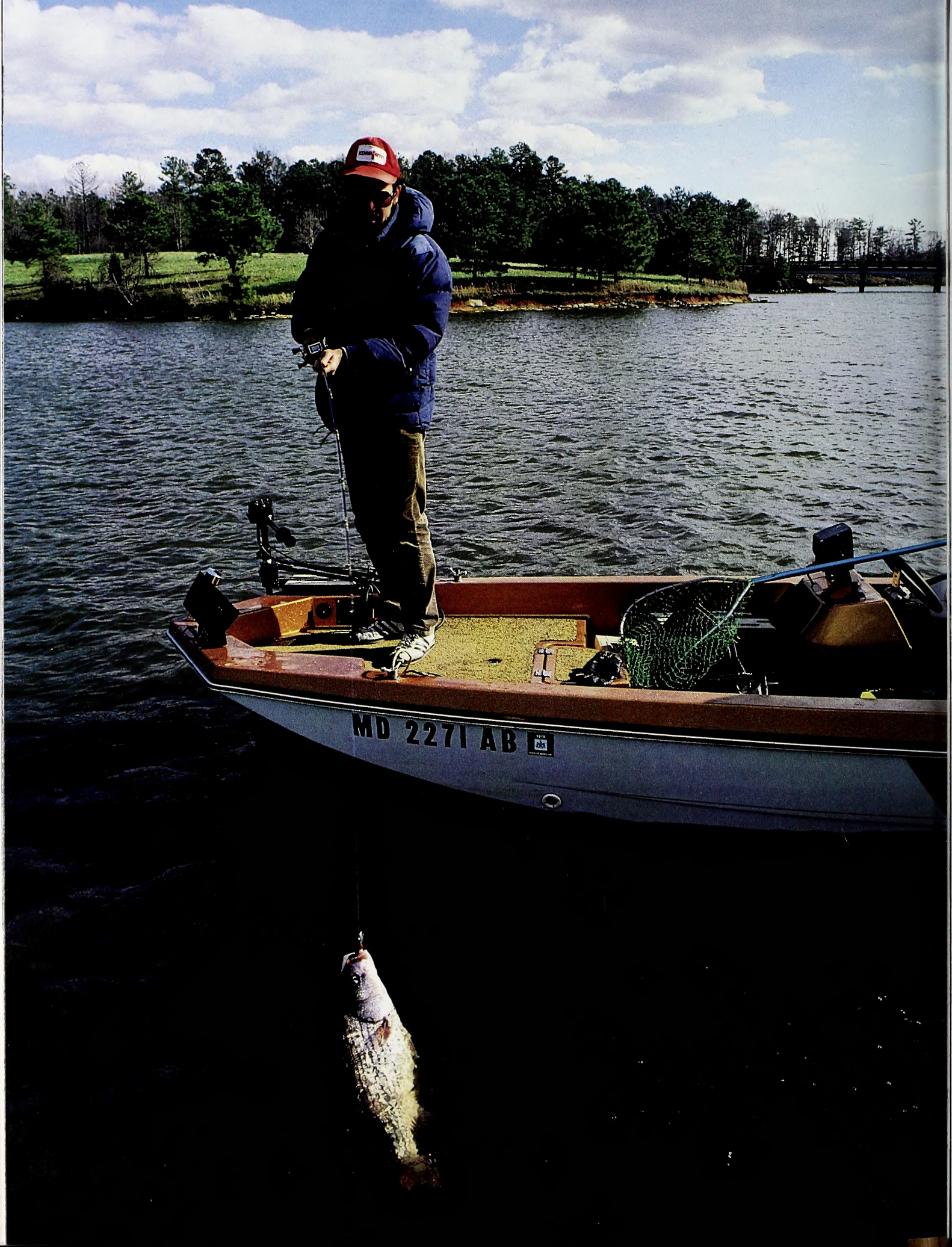
Pick the ramp closest to the area you plan to fish, since long runs are no fun in air that might be 20 to 40 degrees. Also, rig several rods in the warmth of your home before heading out, and cull your gear so that you carry only striper lures and terminal gear in a relatively small tackle box.

Most stripers will run 5 to 15 pounds in North Carolina lakes, and they tend to be caught in open water. That means a spin or baitcast reel with a quality drag filled with 8- to 14-pound-test monofilament line is a good choice. If you know that big fish are possible or snags are plentiful, you may opt for 17- or 20-pound mono or the new braided lines, particularly for trolling or vertical jigging. A stiff rod of 6 to 7½ feet with moderate flexibility in the tip is perfect for most striper tactics.

Live bait fishing is one of the most reliable methods for winter stripers. I use shiners in the 3- to 6-inch class, or live threadfin shad if I can get them. Shad must be handled carefully and kept in circular aerated bait containers.

I used two methods with live baitfish. One is the technique described earlier in which several split shot are crimped a foot or so up the line above a size 2 to 2/0 bait hook. The number and size of shot will vary depending on how deep the fish are holding and whether there is current. A strong current tends to lift the bait off the bottom. This is a good setup for casting and slowly retrieving along the bottom near bridge pilings, submerged islands, points, humps, thermal discharge areas and other holding spots. I cast out, let the bait settle to the bottom, then begin a slow retrieve much the same as if I were fishing a plastic worm. Strikes can come at any time. I give

***Lake Gaston** yielded this nice striper for these two anglers on a bright winter day. Anglers can expect pleasant weather on some winter days, and the fishing is often good then. Still, it pays to be prepared for the season's worst.*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the fish a couple of seconds to take the offering then drive the hook home.

The other method I use with shad and shiners is to fish directly over top of a known school, or over a specific piece of structure where I think stripers might be. You can either anchor or use an electric motor to stay on the spot. Rig up by threading a ½- to 1½-ounce egg sinker on the main line, then tie on a barrel swivel and 24- to 48-inch leader with a 2 to 2/0 hook. You can either strip line off to the level you see fish on the depth finder or lower the bait to the bottom then reel up a couple of feet. Some fishermen like to hold the rod, but you can also place it in a sturdy holder. When a fish strikes, wait until there's a deep bend in the rod, then grab it and turn the reel handle several times to make sure the hook is set.

If strikes are slow in coming, try chumming. Dice up a few shad or shiners and sprinkle them overboard. Also try raising or lowering the level of your bait. If you still get no strikes after 30 or 40 minutes, move to a different location. The shallower the water you find stripers in, the more likely it is that they'll be feeding actively. Both day and night can be productive. At night, you can hang several lanterns over the gunnel to attract shad, which in turn attract stripers.

It's not as common a method, but sometimes a cut chunk of shad or herring or several whole dead threadfin shad or shiners on the same hook will outscore live bait. Fish these offerings on the rig I've described in shallower areas such as mud flats, points and humps. The scent given off by the cut bait can attract fish from long distances.

Trolling is another top tactic for winter stripers. This puts lures down in the strike zone and keeps them there as you slowly motor over areas where you've located prime structure, baitfish or a school of stripers on the depth sounder. Downriggers work especially well because they allow you to position the lure at exactly the depth fish show on the locator. Good offerings include jigs, thin-minnow plugs and shallow-running crankbaits. Set them 50 to 100 feet behind the cannonball on your downrigger.

If you don't want to invest in downriggers, you can use planning devices such as the Luhr-Jensen Pink Lady to take jigs or plugs deep. My favorite trolling rig, however, uses a plug/jig combination. I tie a deep-diving lure such as a Storm Big Mac, Heddon Hellbender, Bomber Waterdog, Bagley Deep Shad or Mann's 20-plus, and attach an 18- to 36-inch leader of 17- to 20-pound mono to the center hook of the front treble. Then I attach a ¼-ounce white bucktail jig to that, or simply a hook with a white plastic worm on it. The plug takes the offering deep and sometimes draws strikes, but it's usually the trailing jig or worm that nails most stripers as it shimmies along behind the big wobbling lure.

***This fat,*** *Lake Gaston striper is tired and ready to land, but you can bet the action was a bit more frantic in the preceding minutes (left). Jigs are particularly effective for stripers at times, but in winter, they are more often fished vertically over schools.*

Motor slowly around river channel edges, flats, humps, saddles and bridges, searching for both stripers and schools of bait on the depth finder. If you draw a strike, drop a buoy marker over and retroll through that area.

Casting with bucktail jigs is another excellent way to take winter stripers, but this works best in water from a few feet to 20 feet deep in areas where shad are present, or where you've caught stripers in the past and know they like to hang out. Use a ¼- to ½-ounce white bucktail jig. I try casting with just the bucktail or add a plastic twister tail or pork rind if it works better. The plain bucktail jigs sink faster and are a better choice if the baitfish are small or the water is particularly clear. In murky water, or when fish are suspended at mid-depths, jigs with plastic tails or rind often draw more strikes, particularly if the quarry is in an aggressive mood.

Cast out and count down to probe various levels from a couple feet below the surface to just above the bottom. Avoid the temptation to jerk and twitch these baits. A slow-to-moderate, steady retrieve works best on stripers. If the fish don't cooperate, try pausing partway back as you retrieve to let the lure sink freely for several seconds like a wounded shad. Then resume reeling. This often spurs reluctant fish to grab the offering. The big advantage to this method is that it lets you cover lots of ground quickly. If you probe a point or flat with 10 to 15 casts and don't get a strike, move quickly to another area. Sooner or later, you'll find the fish.

Vertical jigging is the final tactic you should have in your arsenal of tricks. This is a deadly way to take fish schooled tightly over channel edges, humps and points or around bridge pilings and other structure in depths of 20 to 60 feet. Locate the structure you want to try—hopefully you'll see shad or stripers on the depth finder. Note the level where you see fish or bait and lower a slab spoon to that depth or a foot or so above it. Good offerings include the Hopkins Shorty, Bomber Slab, CC Spoon, Acme KastMaster, Bass Pro Strata, Luhr-Jensen Crippled Herring and the Mann-o-Lure. I prefer these lures in ½- to 1-ounce weights with nickel or silver finishes. Blade-type lures such as the Bullet, Ripple Tail, Cicada and Heddon Sonar also work well.

Pump these heavy metal lures up 1 to 3 feet with a sharp lift then lower the rod tip just fast enough so the lure falls freely, making sure excessive slack doesn't form in the line. Strikes can come at any time but usually occur on the drop and may be felt just as a slight "tick" or sudden slack in the line. Set the hooks quickly at any indication a fish has nabbed the lure. When a 12-pound striper responds with a surging, head-shaking run, you'll forget how cold you were just a moment before. ☒

I can't remember the last time we hunted together. No doubt it was a deer hunt, and most likely a hunt in the Uwharries. That was his favorite sort of land, rolling and wooded and trellised with game trails. We would carry our climbing tree stands into the woods, and he would lead the way, stopping to dribble pungent buck lure onto his boot soles, or to wait for me to catch up. After all, a climbing stand was a bulky load for a kid. Most often he already had our stand sites figured out, and we'd split up in the dark, whispering good luck with breath that rolled out in pillows of steam. I would watch his flashlight beam bob through the black, weaving around trees, until it disappeared in the distance or behind a ridge. Then I would bend over the climber and work the wing nut screws with gloved hands in the small bright circle

# Learning to Hunt

thrown from the flashlight held steady by my teeth. Fifteen years or more have passed since last I shared a wooded ridge with the man who taught me how to hunt, since last I whispered "good luck" to Keith Gleason.

Learning how to hunt is a rite of passage with a near-mystical heritage, particularly in the South. From Yoknapatawpha County to Rockingham County, from Leatherstocking's day to mine, hunting is something most boys have learned from their fathers, who learned to hunt from theirs. Of all my hunting companions today, I can name only three who came to the sport without benefit of a paternal mentor. I am one of the three.

I never hunted with my father, who, to my knowledge, never hunted with his. My family on my father's side comes from a line of small-town merchants. We never owned farms, never worked the land. These days, as the number of hunters dwindles and challenges to the sport grow, there is a lesson in my learning how to hunt. Like too many others today, I had no father to teach me, no uncles or cousins that hunted, no place in the country. Instead there was a man I barely knew who saw a need I could hardly recognize. Instead I had Keith Gleason.

When my father died I was 13 years old; Keith was in his late 20s. One day at church he asked if I'd like to go squirrel hunting the next weekend, and I replied that I'd have to ask my mama. He'd already handled those preliminaries. At 5 a.m. the next Saturday I heard his tires crunch down the gravel drive, and I ran down the back doorsteps, squinting in the glare of the headlights.

All week long I'd wondered what kind of gun I'd use for the fat squirrels of my imagination. I'd shot a gun—a real gun—only once, an ancient Iver Johnson 12 gauge that blew in twain an old tin can that still sits on a shelf above my downstairs workbench. At least a .22 rifle, I thought, maybe a lever action .22, like the one my best friend's dad had given him, and which I seriously coveted. Instead, Keith brought along a single rimfire with a 4X scope. "You just watch me," he said. "Later you can carry a gun."

Later didn't prove to be the next Saturday, or the next. In fact, I followed Keith to the squirrel woods for weeks without ever touching blued steel. "When you're ready," he said, and to hasten that day I memorized the Ten Commandments of Gun Safety and practiced my marksmanship with a spring-action BB gun. I didn't carry a rifle that entire first season but would trade with Keith shot for shot, with no second chances for a miss. Knowing that I had but a single bullet before giving up the gun, I took my time. Sighting in on a squirrel, I'd hold my breath, let half of it out and squeeze the trigger slowly—just like I read in the magazines. This way I learned the lessons: take your time, make each shot count. This was the way I learned how to hunt.

Not that I was a stranger to the woods. By the time I reached junior high school I preferred

"These days, more than ever, learning how to hunt only begins with a gun."

written by Eddie Nickens © 1994
illustrated by David Williams © 1994

*"I didn't know it then, but I was still learning how to hunt."*

a hatchet in my hand to a baseball and spent my days not on the courts but in a patch of forest behind the house and beyond two creeks that joined just across a small meadow. In those riverine woods the neighborhood kids stalked squirrels and songbirds with anything that would fire a projectile: slingshot, air rifle, the blowguns we ordered from the back of comic books. I cringe when I think of the robins and sparrows I thoughtlessly killed—youthful ignorance seems thin armor for such behavior, even now, 20 years hence.

And I remember the first stirrings that there was more to hunting than pulling the trigger. One Christmas Santa gave me a bow, a 45-pound Bear recurve with no sights, a Kwikee Kwiver and a dozen Easton arrows. Compound bows were in their infancy, and everyone knew they were likely a fad. To string the recurve I hooked one tip around the instep of my left foot, stepped through the parabola of laminated wood with my right, braced handle against hip and bent the upper tip toward the bowstring in my hand. I shot countless arrows into four bales of excelsior stacked into a square in the back corner of the yard. The first time I centered the bull's-eye I tacked the target up on my bedroom wall. When I read that Fred Bear had taken an elephant with a single arrow I joined the Fred Bear Sports Club and, in the mail, received a membership card that carried on the back the club's "Code of Ethics." At first it seemed odd that such simple, common-sense tenets would require a written form, until I thought of the songbirds that fell to my air rifle.

By the time I hit high school, squirrel hunting had lost out to high-caliber rifles with Monte Carlo stocks and effective ranges measured in football fields. On Saturday mornings Keith and I would leave High Point early enough to be in Alleghany County not long after sunrise. We hunted groundhogs by cruising back roads and belly crawling to the crests of knolls to glass green fields. I remember that some days we spent as much time talking to farmers about crop prices and rainfall as we did sending hand-loaded .22-250 rounds toward unsuspecting whistle-pigs. To a kid with an itching trigger finger and a new subscription to *Peterson's Hunting*, I had little patience for such niceties. Now I ride those back roads myself and see the barns where

Keith would hold court with some fellow in overalls. And I wish that I still remembered their names and could kill an hour or two catching up where we'd left off. Now I know that solid relationships with landowners lead to hunting opportunities the next year, and the next, for this is how I learned how to hunt.

Some of these memories are dim, too dim, for years have passed since last we shared a canteen or sleeping pad. When I left home for college I found other wooded ridges and beaver ponds. Gradually, Keith and I lost touch, save for a phone call or two during the season, or a visit during a weekend at home.

Still, I hunted through my 20s like a young man possessed. From day one of duck season to the final hunt, I drove a battered Capri stuffed with decoys and capped with a canoe tied down to the door handles. Free from the strictures imposed by hunting with older men, I played a numbers game: how many birds, how many shells, how many days I could hunt in a row. I didn't know it then, but I was still learning how to hunt, burning through gunpowder and youth in order to find a more satisfying, and less results-oriented, manner to approach the field.

I was learning that learning how to hunt means more than figuring out where the squirrels feed or how to lead a quail going away. It means trying to pick out the drakes when a half dozen blue-wing teal skirt the blocks. It means knowing enough about why you hunt to be able to explain to those who ask. It means choosing your hunting companions with as much care as you choose in which trees to build a stand. These days, these trying, critical days, learning how to hunt means hunting in a manner so that fields are open for hunters a dozen years hence, and so that game will be there to find. These days, more than ever, learning how to hunt only begins with a gun.

Just this past September, while we cleaned birds after the Saturday dove season opener, my friend Mike was excitedly relaying the story of attending with his son, Matt, the state's 10-hour hunter education course. "I went mainly so Matt wouldn't have to go by himself," Mike explained, but it was clear that the father gained as much from the experience as the son.

"You know," Mike said, "growing up, we didn't have to worry about what people would think if we went hunting. We didn't have to worry about finding a place. You just went and asked. Now..." He shook his head. After attending the course, Mike has a new understanding of the challenges facing hunting: the bulldozer, the video game, the philosophically opposed and the politically astute. He has, as well, an understanding of the power of each hunter to shape the opinions of the nonhunters around him. "I think everybody ought to take that course, no matter how old they are," he said. Well into his 40s, three decades of gunning under his belt, Mike Davis is still learning how to hunt.

Which is the way it should be.

This year, as I pick up rifle and shotgun and head for the woods, there are lessons I know I will need to relearn. Keep my cheek to the stock on crossing birds. Keep my barrel out of the sun. These are lessons that should put more game on the table, but there are other lessons that I can't afford to forget. Yield to hikers. Close fences behind me. Be courteous to those who don't carry a gun. My education as a hunter is not yet finished.

A few years ago I ran into Keith at the wedding of a mutual friend. Within moments of shaking hands and hugging shoulders we were talking about hunting, about last season's successes and next season's promise. We planned a hunting trip or two—a morning meeting in the woods, or an afternoon back on the New River—just to catch up.

We never went, of course. You know how it is. But had we met on the side of some darkened country road, and walked into woods under a lightening sky, I'm sure I would have wanted Keith to lead the way. I would have taken my place behind him, behind the man who taught me how to hunt. ⊠

*"And I remember the first stirrings that there was more to hunting than pulling the trigger."*

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*For more information about the N.C. Wildlife Resources Commission's mandatory hunter education courses, call (919) 733-7191.*

*Last Year's Poor Weather Blamed for Steep Drop*

# Woodcock Woes Continue as Eastern Population Plummets

*Written and Edited by Vic Venters*

U.S. FISH & WILDLIFE SERVICE

***Woodcock populations** in the Eastern United States suffered their worst recorded decline last year, compounding long term population problems. Bad weather during the 1993 breeding season and last year's harsh winter are blamed for the steep drop, though habitat loss is the greatest threat to woodcock.*

The future for woodcock populations in the eastern United States continues to be gloomy and may soon become grim.

According to the U.S. Fish and Wildlife Service's population index—which is based on the number of singing males located on spring survey routes—woodcock populations were down almost 18 percent from the prior year going into their breeding season this spring. This comes on the heels of other indicators that point to substantial declines in eastern North America. Information provided by wing counts show that the 1993 recruitment index—which is the ratio of immature birds to adult females—was 23.5 percent below the long term average, indicating extremely poor reproduction in the spring and summer of 1993. Seasonal hunter success in the bird's eastern flyway declined almost 28 percent from 1992 to 1993. This latest drop brings the long-term 27-year decline to over 50 percent, as measured by the singing ground survey.

Woodcock populations have been declining on average 1.9 percent per year in the Eastern Flyway for at least 27 years, but last year's double digit drop is being attributed to poor breeding conditions in the spring of 1993, compounded by last year's harsh winter. Unfortunately, all indications are that the spring and summer of 1994 made for another extremely poor breeding season.

"While we don't have any definitive numbers, we are worried about this year's fall flight," said John Bruggink, woodcock specialist for the U.S. Fish and Wildlife Service, the federal agency responsible for managing the bird. "The singing male survey this spring indicated a diminished breeding population and reports from the summer breeding season indicate that it was cold and wet again in the Northeast, which is bad for chick survival." Greg Sepik, another Fish and Wildlife Service woodcock biologist, reported broods in the Northeast as "scarce" this summer and predicted the fall forecast would be "gloomy."

Habitat loss is believed to be the major factor contributing to long term population declines. For optimum breeding grounds, woodcock need early successional habitat provided by small clearcuts, and wetlands or small open fields reverting to alders, aspens and other brushy vegetation. Woodcock populations are thought to have peaked this century after World War II when large numbers of abandoned small farms in the Northeast began reverting to brush. Good woodcock breeding cover typically lasts only two decades or less as trees eventually mature. Much of the prime habitat in the Northeast has been lost to urban or suburban sprawl, or has matured to the point where it is no longer suitable.

North Carolina has a small resident woodcock population, but the major breeding range of the bird is in the Northeast, the Great Lakes states and the Canadian maritime provinces. However, North Carolina and the other southeastern states provide major wintering grounds for the reclusive bird which spends its days in hardwood bottomland forests.

Woodcock are only lightly hunted in the Southeast, including North Carolina. They are, however, popular gamebirds in Lousiana, the Northeast and Great Lakes states. The U.S. Fish and Wildlife Service believes that hunting has not played a role in the woodcock's decline. Biologists at some state wildlife agencies believe that overhunting may be exacerbating population declines and Pennsylvania, for instance, has drastically shortened seasons and reduced bag limits. Despite these measures, woodcock populations continue to decline in Pennsylvania and elsewhere in the Northeast.

The Fish and Wildlife Service has indicated that it may seek restrictions next year to bring the harvest in line with a declining resource. "While the Service doesn't believe that long-term declines are the result of hunting," Bruggink said, "in the face of continuing declines—even if the drop has been caused by other factors—we may need to restrict the harvest next year because of low populations."

Management efforts for woodcock have historically been hampered by a lack of research, in part because of a shortage of funds, and also because the forest-dwelling bird is difficult to study. In 1990, the Fish and Wildlife Service launched the American Woodcock Management Plan, a new federal program designed to halt the declines and restore populations by reversing habitat loss on a landscape basis. Fish and Wildlife Service experiments in the Northeast have proven that woodcock populations can be increased dramatically through small clearcuts and managed cutting in prime breeding areas. But instituting woodcock management on a large scale basis has been, and will continue to be, difficult. In many cases, commercial logging does not produce optimum woodcock habitat, and public sentiment against timber cutting for forest and wildlife management activities is substantial.

"Continued population declines are likely unless the loss of early-successional forest habitat is halted," writes the U.S. Fish and Wildlife Service. "Implementation of sustained yield forest management on public and private lands is one key to maintaining woodcock populations and biological diversity within the woodcock breeding range."

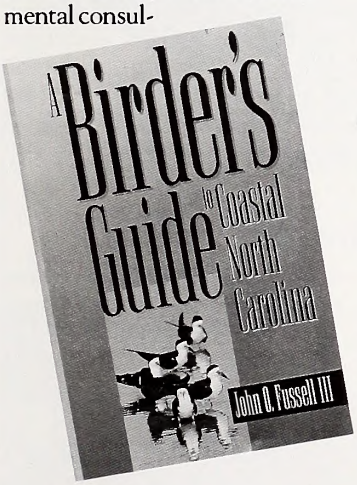
*Book Review*

## *A Birder's Guide to Coastal North Carolina*

A Birder's Guide to Coastal North Carolina *by John O. Fussell III, published by the University of North Carolina Press, P.O. Box 2288, Chapel Hill, NC 27515, 1994, maps, graphs, 540 pages.*

John Fussell's *A Birder's Guide to Coastal North Carolina* is a work that belongs in the library of any serious birder in North Carolina. This voluminous 540-page work is a detailed field guide to most of the best accessible birding sites in eastern North Carolina, areas that include state parks and gamelands, national wildlife refuges, seashores and forests, as well as other public areas.

Fussell, the author of *Finding Birds in Carteret County*, is a Morehead City-based environmental consultant and well known ornithologist. The book first provides an overview of the climate, physiography and habitat of Coastal North Carolina. The author, who spent eight years compiling data for the book, then tackles birding opportunities in Northeast coast, the Albemarle-Pamlico area, the Outer Banks, the Central Coast area, the South Coast section and pelagic birding areas.




For each birding area Fussell takes the reader on a tour that includes directions on how to get there, where to look and what species are most commonly observed. Detailed maps, driving and hiking instructions and telephone numbers are provided. Also included is an index to bird species, a chapter devoted to 141 species of birds of special interest and graphs that show the time of year and seasonal frequency of visitation for each species. Tips for viewing different species will help both the beginning and advanced birder.

More than 400 birds species live in or visit the coastal region, and this book does a superb job telling you when and where to find them. The book will be available in paperback for $16.95 and for $29.95 in hard cover.

—V.V.

*Speedy Delivery to Buyers*

## Commission License Program Wins Award

The Wildlife Commission has been recognized for developing a computerized phone system for selling hunting and fishing licenses that accepts credit cards and instantly issues a verification code that allows a sportsperson to immediately use their privileges. The licenses and appropriate tags are then mailed the next business day.

Moore Business Forms of Lake Forest, Ill., awarded the Wildlife Commission its 1994 Award of Excellence for Form System of the Year. The initial system was designed by John Hill, assistant chief of the Wildlife Commission's Administrative Services Division and the final design was implemented by the division's Computer Applications Committee.

## The 1995 North Carolina Wildlife Calendar Is Here!

***"April Calling"*** *by Duane Raver is one of 12 paintings featured in the 1995 North Carolina Wildlife Calendar. Order now before they're sold out.*

The works of James A. Brooks, Robert B. Dance, Robert C. Flowers, Jr., Bob Herr, Lee James, Cathy Kinlaw, Brooks Pearce, Duane Raver, Mel Steele and David Williams are featured in the 1995 Wildlife Calendar. Order yours today by returning the form below with your check or money order to 1995 Calendar, N.C. Wildlife Resources Commission, 512 N. Salisbury Street, Raleigh, N.C. 27604-1188.

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**For fund raising and bulk rate information (10 calendars or more), call 919-662-4377. Please allow 6 weeks for delivery.**

CALO95

*Reader Likes Writer's Style*

## Wild Turkey Restoration Article Praised

Dear Editor:

After reading the article "Full Circle" (April 1994) by Mike Seamster, I wish to relay that this is one of the best articles your magazine has ever printed. As a professional writer and naturalist myself, I am an avid reader of all nature publications. Mike Seamster not only provided an excellent article about the turkey restoration program in our state, but the manner in which he chose to present it made the biggest impact of all. Seamster's story of the old man whose recollections came full circle from a poacher to a conservationist gave the article a personal flavor that provided quality entertainment as well as education.

My daddy, Joe Leggett of Bertie County, died a year ago but he left behind a daughter and four sons in whom he had instilled not only a love of the outdoors, but also a lifetime of leadership and guidance of "using but not abusing." He enjoyed your magazine and was a perfect example of how to be both a hunter and a conservationist. None of my programs at the Morningstar Nature Refuge conflict with hunting, and I have the support of hunting clubs in the area that go out of their way to help me.

I congratulate Mike Seamster on a wonderful piece of writing that is far superior to most I see these days.

*—Gail L. Roberson, President*
*Morningstar Nature Refuge,*
*Williamston*

*First Since 1977*

## Index Returns

For the first time in almost two decades, an annual index has returned to *Wildlife in North Carolina*. The magazine's last annual index was published in 1977.

The index was originally dropped because it became too long and unwieldy to publish. However, readers have asked for it to be re-instated, and an abbreviated version has been prepared for publication. *Wildlife in North Carolina* is a popular and widely used resource in schools and libraries and an index will allow educators and other users to locate articles more easily and quickly.

The Division of Conservation Education has also begun work to revise its more detailed computerized index so that it can be made accessible to computerized networks across the state. See page 32 for the 1994 index.

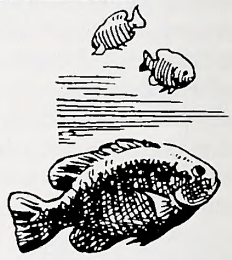
*Caught in Stream*

## Record Roanoke

A new state record Roanoke bass was landed in April, breaking a record set 16 years ago.

Angler Richard E. Evans of Enfield caught the 2-pound, 10¾-ounce fish from Fishing Creek in Nash County on April 27. The bass, which was 15 inches long with a girth of 13¼ inches, hit a spinner bait.

The new record broke the old record, set in 1978 by Freddy H. Casten, by a little over 2¾ ounces. Casten's record fish had been caught on a plastic worm at Hope Mills Lake.



*$3,000 to Educate Young Shooters*

## QU Donates to Hunter Education Program

JANET HILL SPENCER/THE DAILY ADVANCE

***This year, QU's** North Carolina State Council presented a check for over $3,000 to the Wildlife Commission's Hunter Safety Education Program. The funds will be used to further hunter safety education in the state and to support youth shooting teams across the state. Lt. Randy D. Thomas, hunting and boating safety coordinator for the Wildlife Commission's Division of Enforcement, accepts the check from W. F. Ashburn, chairman of QU's N.C. State Council (left) and Preston Tyndall, a QU chapter president.*

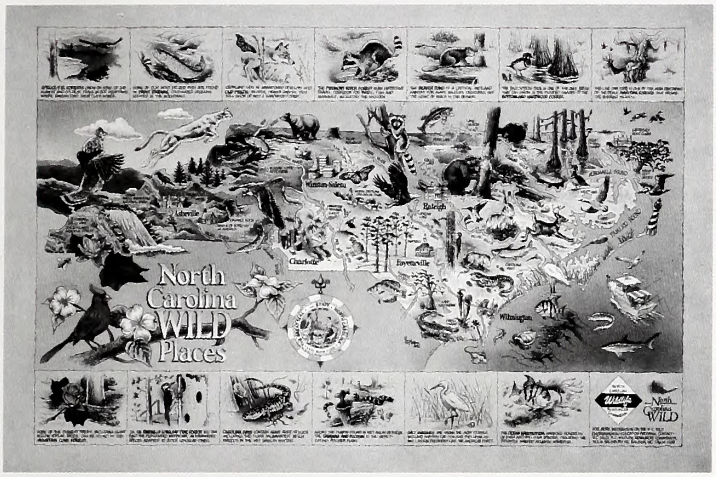
## Field Notes

| | |
|---|---|
| Eastern Gun Deer | Through Jan. 2 |
| Central Gun Deer | Through Jan. 2 |
| Northwestern Gun Deer | Through Dec. 10 |
| Western Gun Deer | Through Dec. 10 |
| Black Bear | See *Regulations Digest* |
| Wild Boar | See *Regulations Digest* |
| Crow | See *Regulations Digest* |
| Gray Squirrel | Through Jan. 31 |
| Fox Squirrel | See *Regulations Digest* |
| Quail | Through Feb. 28 |
| Rabbit | Through Feb. 28 |
| Ruffed Grouse | Through Feb. 28 |
| Raccoon and Opossum | See *Regulations Digest* |
| Common Snipe | Through Feb. 28 |
| Mourning Doves (third season) | Dec. 12-Jan. 14 |
| Ducks, Mergansers and Coots (third season) | Dec. 19-Jan. 20 |
| Brant | Dec. 6-Jan. 20 |
| Snow and Blue Geese | Through Feb. 10 |
| Sea Ducks | Through Jan. 20 |
| Tundra Swan (by permit only) | Through Jan. 31 |
| Woodcock | Dec. 8-Jan. 21 |

Information on bag limits, either-sex hunts, permits and other regulations may be found in the *1994-95 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest*. For a copy, check with license agents or contact the N.C. Wildlife Resources Commission.

*Colorful Painting Featured*

## WILD Places Poster Becomes Placemat




***In cooperation with the** Wildlife Resources Commission, Scott Foodservice, a division of Scott Paper Company of Wisconsin, is making available a paper place mat featuring the artwork of the North Carolina WILD Places poster. Each place mat features a full color reproduction of artist Jackie Pittman's painting. Place mats are available in quantity for restaurants, school cafeterias, churches and others who wish to purchase them and help promote North Carolina's varied wildlife and natural habitats. A portion of the sale proceeds will be donated to the N.C. WILD Environmental Education program. For more information, contact Scott Paper Company at 1-800-327-9774.*

## Wildlife Endowment Fund Report

**September 1994**

Principal Balance
$20,207,627.78

Interest Earned
$15,734,644.31

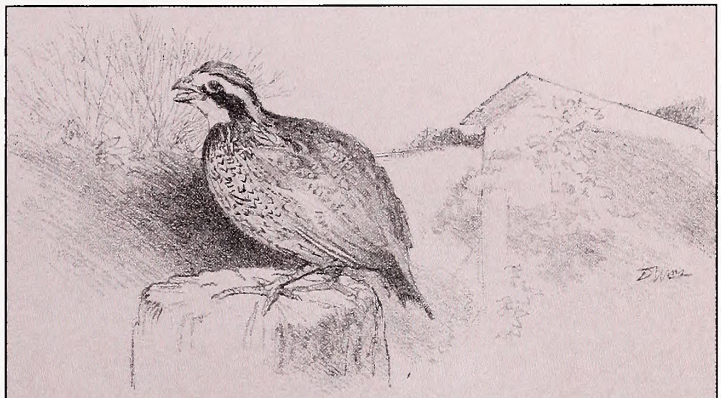
Total Receipts
$35,942,272.09

Interest Used
$7,410,551.48

Fund Balance
$28,531,720.61

Established on May 29, 1981, this fund is derived from the sale of lifetime hunting and fishing licenses and lifetime subscriptions to *Wildlife in North Carolina* magazine as well as from tax deductible contributions. While the interest may be used to supplement N.C. Wildlife Resources Commission programs, the principal remains invested to generate additional interest for the future.





# Half-Cutting for Hedgerows

*by Vic Venters*

From England's green and pleasant hills comes a hedgerow management tip that could prove enormously useful to Americans interested in improving wildlife habitat on farms. It's called "half-cutting" and British farmers and landowners have used it for centuries to create natural fences for enclosing sheep and other livestock. Terry Sharpe, the Wildlife Commission's chief small game biologist, has experimented with the technique and been pleased with its benefits for wildlife.

When hedgerow vegetation is relatively young, the dense briers and young trees along it provides excellent escape cover from predators for a variety of wildlife species. However, as trees along the hedge mature and grow taller, their overstory eventually begins to shade out the ground cover, thereby diminishing the hedgerow's utility to small game species and many songbirds.

To "rehabilitate" a thinning hedgerow, land managers should focus on hardwood tree species in the hedge that are about eight to 10 inches in diameter. The trees should be "half-cut" with a chainsaw about two-thirds of the way through, then pushed over parallel along and into the hedgerow. Cut the tree at about knee-high level. The critical point to remember is to leave the top attached to the stump with the bark (or cambium) layer intact and still attached on the side of the tree where the tree wasn't completely sawn through.

The intact bark layer should be, as English hedge managers say, "about as thick as a sheep's tongue"—or three to four inches wide. The bark will keep nutrients flowing to the fallen top. Not only will ground vegetation begin to flourish as sunlight reaches it again, but the stump and fallen crown will also begin resprouting vertically along its length, thereby creating thick cover for the length of the tree. It makes superb wildlife cover and if you can cut trees so that fallen tops overlap, so much the better.

Sharpe has found that half-cuts made in winter are best as the weather is cool and the sap isn't rising yet. When working with chain saws, remember to wear safety goggles, gloves and exercise appropriate caution while cutting.

# WILDLIFE IN NORTH CAROLINA 1994 INDEX


| Article | Author/Photographer | Topic | Issue |
|---|---|---|---|
| **Art/Photo Portfolio** | | | |
| 1994 Year of the Coast Photo Contest | None | Photo contest | April |
| Wild Orchids | Hal Horwitz | Orchid photos | June |
| The Art of Patricia Savage | Patricia Savage | Art portfolio | July |
| Beaches From Above | Conrad H. Lowman | Aerial beach photos | Aug. |
| Mountains in the Mist | William S. Lea | Mountain photos | Sept. |
| Celebrate the Coast | Various | Photo contest winners | Nov. |
| Symphony in Silhouette | Derrick Hamrick | Silhouette photos | Dec. |
| **Commission Activities** | | | |
| Boy Scouts Go WILD | Mike Campbell | Project WILD | May |
| Hunting at School | Michael Faw | Hunter Safety program | Nov. |
| **Conservation, Environment** | | | |
| The Scuppernong Runs Through It | Vic Venters | Habitat conservation | June |
| Can We Build a Wetland? | Lawrence S. Earley | Wetlands mitigation | July |
| **Fishing, Freshwater** | | | |
| Fishing Down Memory Lane | Jim Simmons | Millpond tactics | March |
| Traditional Dry Flies of the Southern Appalachians | Vic Venters | Flyfishing | April |
| Bream Every Which Way | Gerald Almy | Bream | May |
| Woebegone Warmouths | Eugene Hester | Warmouth | May |
| Dribbling Contours for Bass | Soc Clay | Bass | June |
| Shooting Crappies | Tim Mead | Crappies | July |
| Small Lures & Largemouths | Soc Clay | Bass | July |
| The Rock in Winter | Gerald Almy | Striped bass | Dec. |
| **Fishing, Saltwater** | | | |
| Salt & Flies | Tom Earnhardt | Flyfishing | April |
| Fishing the *Oregon* Trail | Joe Malat | Oregon Inlet | June |
| Specks and Spot-Tails | Joe Malat | Sea trout | Aug. |
| **Fisheries Management** | | | |
| Soda Crackers or Slabs? | Scott Van Horn | Crappies | Feb. |
| Rockfish on the Rebound | Kent Nelson | Striped Bass | March |
| **Hunting, Big-Game** | | | |
| Sorcery for Big-League Bucks | Mike Gaddis | Deer | Oct. |
| Hunting Season Roundup | Staff | Hunting season dates | Oct. |
| **Hunting, Small Game and Waterfowl** | | | |
| Big-Bore Bruisers | Eddie Nickens | Shooting technology | Jan. |
| After Opening Day | Vic Venters | Doves | Sept. |
| Hunting New Age Quail | Mike Gaddis | Quail | Nov. |
| Learning to Hunt | Eddie Nickens | Hunting ethics | Dec. |
| The Art of Calling | Vic Venters | Waterfowl calling | Dec. |
| **Natural History and Wildlife** | | | |
| Shadows in the Woods | David S. Lee | Hawks | Jan. |
| Regarding Groundhogs | David S. Lee | Groundhogs | Feb. |
| The Complete Osprey | David S. Lee | Ospreys | March |
| Desperately Seeking Salamanders | John Connors | Salamanders | March |
| Dinosaurs Down the Cape Fear | David S. Lee | Prehistoric N.C. | April |
| Whales on the Beach | David S. Lee | Whale strandings | May |
| Oh Say Can You See... | Deborah Wechsler | Chiggers | May |
| Do They Really Have 1,000 Legs? | Harry Ellis | Centipedes/Millipedes | June |
| Fish That Fly | David S. Lee | Flying fish | July |
| Life in a Mountain Stream | Harry Ellis | Ecology | Aug. |
| Just When You Thought It Was Safe... | Peter & Catherine Meyer | Ocean hazards | Aug. |
| Multitudes of Mullet | Bob & Mary Simpson | Mullet | Sept. |
| Workers of the World | Harry Ellis | Carpenter ants | Sept. |
| Bee Gums, Rabbit Gums & Mountain Toothbrushes | Doug Elliott | Black gum tree | Oct. |
| **Nature's Ways** | | | |
| Big, Bad Gull | Lawrence S. Earley | Seagulls | Jan. |
| Uncommon Coastal Visitors | Lawrence S. Earley | Visiting species | Feb. |
| A Case of Piracy | Lawrence S. Earley | Roanoke bass | March |
| Snake in the Nest | Lawrence S. Earley | Bird nests | April |
| The Longest Wait | Lawrence S. Earley | Cicadas | May |
| The Dune Makers | Lawrence S. Earley | Beach vegetation | June |
| The Fiery Story of Wiregrass | Lawrence S. Earley | Wiregrass/fire ecology | July |
| Reptiles and their Young | Lawrence S. Earley | Reptiles | Aug. |
| Suckers Are for Real | Lawrence S. Earley | Suckers | Sept. |
| Long-Lost relatives | Lawrence S. Earley | Disjunct species | Oct. |
| Saga of the Tasty Terrapin | Lawrence S. Earley | Diamondback terrapin | Nov. |
| The Invisible Language of Scent | Lawrence S. Earley | Animal scents | Dec. |
| **North Carolina History** | | | |
| Rails Through the Hills | Jim Wrinn | Logging railroads | Jan. |
| Remembering Hazel | Jay Barnes | Hurricane Hazel | Oct. |
| Bird Man of Fort Macon | Eric Bolen | Dr. Elliot Coues | Nov. |
| Living at the Lighthouse | Sarah Friday | Lighthouse keeper | Nov. |
| **Outdoor Recreation** | | | |
| Room at the Top | Lisa M. Stroud | Mt. LeConte | March |
| Sourdough in the South | Soc Clay | Sourdough cooking | Dec. |
| **Our Natural Heritage** | | | |
| A Train up Every Creek | Jim Dean | Railroads | Jan. |
| Fly Fishing's Second Coming | Jim Dean | Fishing | Feb. |
| Greasy Burgers and Curb Service | Jim Dean | Traditional cuisine | March |
| Enough Is Not Enough | Jim Dean | Fishing | April |
| Breaking In a New Guide | Jim Dean | Fishing | May |
| Benny and Elmo | Jim Dean | Turtles | June |
| Where Are You, Ralph? | Jim Dean | Seasickness | July |
| The King in Eclipse I | Jim Dean | King mackerel | Aug. |
| The King in Eclipse II | Jim Dean | King mackerel | Sept. |
| A Brief History of Hats | Jim Dean | Hats | Oct. |
| The Laws of Discontinued Perfection | Jim Dean | Philosophy | Nov. |
| When Honeybuns Go Bad | Jim Dean | Philosophy | Dec. |
| **Profiles, Personalities** | | | |
| Carolina Profile: Environmentalist at Large | L. Earley & S. Baynes | Dr. Tom Quay | Aug. |
| **Wildlife Management** | | | |
| Ruffly Speaking | Vic Venters | Grouse | Jan. |
| Partners in Flight | Lawrence S. Earley | Songbird declines | Feb. |
| Counting All Calls | Eddie Nickens | Bird call counts | Feb. |
| Are Pesticides Harming Quail? | Vic Venters | Quail/Pesticides | Feb. |
| Full Circle | Mike Seamster | Wild turkeys | April |
| What's Good for Buck | Vic Venters | Quality deer | Sept. |
| Bands & Boxes | Vic Venters | Wood ducks | Oct. |
| **Wildlife Through The Year** | | | |
| Boxing Behavior | Vic Venters | Wood duck boxes | Jan. |
| Watching What They Eat | Vic Venters | Bird feeding | Feb. |
| Easing into Conservation | Vic Venters | Easements | March |
| Time for Turtles | Vic Venters | Sea turtles | April |
| Improved Pond Fishing | Vic Venters | Pond video | May |
| Planning For Forest Beauty and Diversity | Vic Venters | Forest Stewardship | June |
| A Cutting Question | Vic Venters | Mowing tips | July |
| Cattle and Wildlife | Vic Venters | Habitat management | Aug. |
| Tax Credits for Conservation | Vic Venters | Tax deductions | Sept. |
| Rabbit Management 101 | Vic Venters | Rabbit booklet | Oct. |
| Help Fight Finch Eye | Vic Venters | Birdfeeder tips | Nov. |
| Half-Cutting for Hedgerows | Vic Venters | Small game habitat | Dec. |

Wishing you and yours a
happy holiday season!
From the Staff of Wildlife in North Carolina
WILDLIFE
IN NORTH CAROLINA
$1.50
JULY 1994
MELISSA McCAW

## Bird in Black

The eye is always drawn to the simple power of a silhouette, especially outdoors where nature creates scenes as unpredictable as they are unforgettable. This great egret feeding at the water's edge near dusk has given the photographer an opportunity to capture a strong image.

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